Upper Berryessa Creek Flood Risk Management Project
Santa Clara County, California

Final Environmental Impact Report
(State Clearinghouse No. 2001104013)

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Prepared for:

Santa Clara Valley Water District

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EXECUTIVE SUMMARY

ES.1 INTRODUCTION

This document addresses proposed modifications to Upper Berryessa Creek within the cities of Milpitas and San Jose, California. These modifications include flood risk management improvements along 2.2 miles of Upper Berryessa Creek, stretching from I-680 downstream to Calaveras Boulevard. The primary improvements include:

- Constructing a floodwall at the area identified as being most in danger of overtopping;
- Excavating sediment and vegetation;
- Enhancing flood passage through culverts and bridges; and
- Improving access for maintenance, including sediment removal and vegetation management.

As the primary water resources agency for Santa Clara County (the County), the Santa Clara Valley Water District (the District) provides water-related services including wholesale distribution, stream maintenance, and flood protection throughout the Santa Clara Valley. In order to alleviate flooding in the Upper Berryessa Creek area, the District is proposing flood risk management measures that would provide protection from the base flood (also referred to as the 100-year flood).

The District has formed a partnership with the U.S. Army Corps of Engineers (USACE) to plan and implement the proposed project. The USACE is the Federal project sponsor and the District is the local sponsor. USACE would be responsible for permitting, contracting and oversight of construction activities and the District would be responsible for acquiring real property needed for the project (including temporary and permanent easements), making real property owned or to be acquired by the District for the project available for construction, and operating and maintaining the creek channel after construction is complete.

As part of the process of studying the feasibility of the proposed project and its alternatives, the USACE prepared the Berryessa Creek Integrated General Reevaluation Report (GRR) and Environmental Impact Statement (EIS), which was finalized in 2014. The GRR/EIS documents the planning and evaluation process that identified the USACE's preferred alternative, the results of hydraulic, economic, geotechnical, and other studies that informed the process, and the environmental impacts that could occur during construction and operation of the proposed project. As the GRR/EIS has been finalized, the USACE is preparing the project designs and intends to implement the selected plan. The District's proposed project consists of the project as selected by the USACE with an improvement that would increase the level of flood protection to meet Federal Emergency Management Agency (FEMA) certification standards. The improvement that would be added to the USACE-selected project to achieve FEMA certification is increasing the length and height of a concrete floodwall located on the west bank of the creek in Reaches 2 and 3. The USACE-selected project design includes a roughly 1,300 foot long, 1.5 foot high floodwall at this location; the proposed project would increase the length of the floodwall to about 2,200 feet. The maximum height of the floodwall would be 2 feet above ground level.

The District determined that construction of the proposed project could have a significant effect on the environment and ~~is~~ has therefore prepared~~ing~~ this Environmental Impact Report (EIR) in compliance with the California Environmental Quality Act (CEQA). This ~~Draft~~ EIR ~~(DEIR)~~ is intended to:

- Provide a complete description of the proposed project to the public;
- Inform the public of any significant impacts that could occur as a result of project implementation;
- Identify measures that would avoid, reduce, or mitigate any significant effects; and

- Describe and evaluate other alternatives that may feasibly accomplish the goals and objectives of the proposed project.

ES.2 OBJECTIVES

The District developed three project-specific objectives, which provide the basis for potential modifications to complete the proposed project.

Objective 1: *Reduce flood damages from Berryessa Creek upstream of Calaveras Boulevard throughout the study reach during the 50-year period of analysis beginning in 2017. Completed project would meet FEMA certification standards in all 4 project reaches.*

Objective 2: *Use environmentally sustainable design practices in addressing the flood risk management purpose of the project wherever possible within the study reach, including taking advantage of restoration opportunities that may be pursued incidentally to the flood damage reduction purpose.*

Objective 3: *Be consistent with Berryessa Creek Flood Risk Management Project Plan selected by USACE in the Director's Report of May 29, 2014.*

ES.3 BACKGROUND

Flooding within the Berryessa Creek watershed and vicinity has occurred often during the past decades. Stormwater flooding that inundates streets and yards occurs an average of at least once every 4 years. Overflow channel flooding also occurs along Upper Berryessa Creek on average of once every 10 to 20 years, which results in significant damage to homes, businesses, infrastructure, and automobiles.

High rainfall events occurring in 1982, 1983, and 1998 caused extensive flooding and damage to areas along creeks in the cities of San Jose and Milpitas. As a result of these and other floods, the District and the USACE commenced studies to identify areas of Berryessa Creek and its tributaries, a part of the Coyote Watershed, that are most vulnerable to flooding. Teams of hydraulic engineers, planners, and field inspectors reviewed historic flood information, topographic maps, and other available data and reports, and prepared detailed hydraulic models of the Upper Berryessa Creek system. The resulting studies in hydraulics, economics, geotechnical issues, hazardous materials, and sediment movement resulted in the Berryessa Creek Project GRR-EIS. These studies indicate that Upper Berryessa Creek does not have sufficient capacity to contain the 1 percent (100-year) recurrence flood, meaning that destructive flooding would continue to occur unless measures are taken to expand flow capacity. The dollar value of flood damage from the 1 percent flood is estimated at $528 million in 2011 dollars (USACE 2014).

ES.4 PROJECT SUMMARY

Working closely with USACE, the District has developed the Upper Berryessa Creek Flood Risk Management Project, which is described and analyzed in this EIR. The proposed project would provide flood protection and flood damage reduction benefits along Upper Berryessa Creek by incorporating channel, bridge, and top of bank improvements designed to convey the 1 percent recurrence flood within its banks. The proposed project consists of the USACE-selected project with addition of a taller and longer concrete floodwall in Reaches 2 and 3 compared to the USACE-selected project. The proposed project is designed to meet FEMA certification standards. The proposed project would remove an estimated 500 parcels of land from the flood hazard zone. Under the proposed project, all work would occur downstream of I-680 and upstream of Calaveras Boulevard. The District is implementing a separate project to improve the flow conveyance capacity of Lower Berryessa Creek between Calaveras

Boulevard and the Lower Penitencia Creek confluence. Calaveras Boulevard forms the boundary between the Upper Berryessa Creek Flood Risk Management Project and the Lower Berryessa Creek Flood Protection Improvements Project. Both projects would be designed to contain the 1 percent flow without overtopping of banks. The channel of Upper Berryessa Creek would be designed with vegetated side walls to add capacity and provide bank protection within the existing right-of-way (ROW). The channel banks would be protected with biodegradable erosion control blankets and hydroseeded, an approach that has been shown in the Design Documentation Report (Tetra Tech 2015f) to be sufficient to prevent significant erosion. The channel would also have an earthen channel bottom with buried rock revetments for channel stability. The existing access road alignments would be retained and additional access added on the east bank at the downstream end of the project area.

ES.5 CONSTRUCTION AND MAINTENANCE

Construction of the proposed project would include excavating a wider channel, constructing a floodwall on the west bank, installing a concrete box culvert to replace an existing railroad trestle as well as installing new culverts at the mouths of Piedmont and Los Coches Creeks, revegetating affected areas, and constructing or upgrading access roads. Construction would occur over 1 to 2 years, with construction primarily occurring between May and October to coincide with the driest time of year. Construction hours would generally be during normal business hours, but after-hours work may be needed to pour concrete or replace the existing UPRR trestle with a concrete box culvert.

As part of the District's Stream Maintenance Program 2 (SMP2), after construction is complete, District maintenance staff would periodically remove sediment as needed to ensure the capacity of the channel is sufficient to convey the design flow, mow or spray vegetation to facilitate access and reduce fire hazards, and inspect access roads for erosion or ~~blockages~~obstructions. Maintenance staff would also inspect and repair structures such as rock revetment, concrete linings, and stormwater outfalls as needed. The District would also remove trash or obstacles that may hinder flood flows. Because the improved channel would more efficiently pass flood flows and would be less prone to erosion, future maintenance needs would be reduced compared to current conditions.

SMP2 is an ongoing District activity that is not part of the proposed project. SMP2 activities are permitted by regulatory agencies and all SMP2 activities on Upper Berryessa Creek will be implemented in conformance with the SMP2 permits. The cumulative impacts section of this EIR addresses potential environmental effects of SMP2 activities that could add to the environmental effects of the proposed project.

After construction of the proposed project is completed, the District would continue the ongoing SMP2 maintenance practices at the Upper Berryessa Creek project area, and would ~~add measures to maintain~~perform inspection of the newly constructed floodwalls and culverts. Additional maintenance activities associated with the project include inspection and graffiti abatement at floodwalls and culverts,~~ and~~ additional access road inspections, and maintenance. These activities would occur regularly to maintain channels and structures at design conditions.

ES.6 SUMMARY OF ALTERNATIVES

In accordance with CEQA Guidelines § 51526.6(a), this EIR analyzes four alternatives to the proposed project. They are intended to provide a range of alternative actions that could feasibly achieve the project objectives while avoiding or substantially reducing significant environmental impacts. The alternatives are as follows:

- **No Project Alternative**

- **Alternative 2A**: U.S. Army Corps of Engineers Selected Project
- **Alternative 2B**: Expanded Incised Trapezoidal Channel (FEMA Certification Performance)
- **Alternative 4**: Walled Trapezoidal Channel (FEMA Certification Performance)

The proposed project would achieve all project objectives (see Table ES-1).The No Project Alternative would not meet project objectives and is analyzed in this EIR for comparison purposes. Alternatives 2A, 2B, and 4 would partially meet project objectives. Specifically, Alternative 2A would not meet FEMA certification standards and would only partially achieve Objective 1. Alternatives 2B and 4 would meet Objectives 1 and 2, but would not meet Objective 3 (Be consistent with USACE-selected plan).

Table ES.1: Project Alternatives Compared to Project Objectives

Alternative	**Objective 1**	**Objective 2**	**Objective 3**
Proposed Project	Meets	Meets	Meets
No Project	Does not meet	Does not met	Does not meet
Alternative 2A	Partially meets	Meets	Meets
Alternative 2B	Meets	Meets	Does not meet
Alternative 4	Meets	Meets	Does not meet

These alternatives and the proposed project are analyzed in this EIR to determine the environmentally superior alternative. Based on the evaluation of potential impacts presented in Chapters 3, 4, and 5 of the Draft EIR, the proposed project is environmentally superior because it would accomplish the project objectives (reduce flood damages, incorporate environmentally sustainable design practices, and be consistent with the USACE's selected plan) while minimizing construction-period environmental impacts.

ES.7 IMPACTS AND MITIGATION MEASURES

Table ES-2 identifies potential impacts that would occur under the various alternatives. With the exception of impacts to air quality, construction noise, and emissions of greenhouse gases, all significant environmental impacts could be reduced to less than significant levels by implementing mitigation measures described at the end of each resource section.

For all alternatives other than the No Project Alternative, emissions of nitrogen oxides (NOx), temporary noise impacts during construction, and greenhouse gas emissions would exceed applicable significance thresholds. Feasible measures to mitigate these impacts are identified in this EIR, but would not reduce these impacts to a less than significant level. These impacts would be significant and unavoidable under the proposed project, as well as under Alternative 2A, Alternative 2B, or Alternative 4.

The cumulative impacts of the proposed project and alternatives combined with impacts from other recent, ongoing, or reasonably foreseeable projects were also assessed. This analysis found that, in combination with other projects, the proposed project would make cumulatively considerable contributions to significant cumulative impacts on air quality, noise, and greenhouse gas emissions. In all other resource categories, cumulative impacts would either be less than significant, or if the cumulative impact would be significant, the proposed project's post-mitigation contribution to the impact would not be cumulatively considerable.

ES.8 AREAS OF KNOWN CONTROVERSY

The District issued a Notice of Preparation and invited individuals, organizations, and agencies to comment on the scope of the ~~Draft~~ EIR in October, 2001. Notable concerns focused on addressing degradation of natural resources by reducing channelization and eliminating concrete lining to the

degree possible; designing the channel to allow for natural fluvial processes to occur; positioning maintenance roads outside of the channel; and ensuring that the completed project accommodates existing storm drainage facilities at any State highway bridge crossings.

USACE and the District have addressed these concerns in the project designs, as reflected in this ~~Draft~~ EIR. Although the proposed project evaluated in this ~~Draft~~ EIR is reduced in scope from the project as proposed in 2001, the design includes widened channel that will allow for more natural fluvial processes, and which has an earthen bottom except beneath bridges and culverts; maintenance roads positioned in the overbank areas except for ramps needed to allow access to the channel bottom; and storm drainage facilities that are maintained or improved relative to their original condition. Other areas of controversy have not been identified.

ES. 9 ISSUES TO BE RESOLVED

Consultation between the project sponsors and permitting agencies has either been initiated or will be required in order to resolve any permitting issues that may arise. USACE regulations generally require USACE to seek Section 401 water quality certification for USACE projects involving a discharge into waters of the U.S. even though USACE does not issue itself a Section 404 permit. However, the project, as a project authorized by Congress that has completed an EIS, qualifies for exemption under 33 U.S. Code 1344(r). USACE will either obtain a Section 401 water quality certification or claim exemption under 33 U.S. Code 1344(r) for the proposed project. Also, USACE will refine the project design to determine the most appropriate location and sizes of mitigation areas for planting of native tree and shrubs in accordance with the U.S. Fish and Wildlife Service Coordination Act Report of April 2013 and follow-on consultations between USACE and USFWS.

Maintenance and operation of the reconstructed creek channel would be the responsibility of the District. Most maintenance activities would be similar to the creek maintenance activities currently performed under the District Stream Maintenance Program (SMP). Regulatory permits for the SMP cover vegetation management, sediment removal, bank stabilization, management of animal conflicts, and minor maintenance (e.g. fence repairs, access road maintenance, minor sediment removal of less than 25 cubic yards, graffiti abatement), which would be the same activities needed to maintain the creek after construction is complete. However, the reconstructed creek channel would be widened compared to the existing channel and the SMP permits may not account for the area of channel enlargement. If necessary maintenance activities are not covered by SMP permits, the District would obtain approval and permits for the uncovered activities from The San Francisco Bay Regional Water Quality Control Board, California Department of Fish and Wildlife, and USACE Regulatory Branch as required by law.

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Table ES.2 Summary of Significant Effects, Mitigation Measures, and Level of Significance by Alternative					
ENVIRONMENTAL RESOURCE	**PROPOSED PROJECT** Widened Trapezoidal Channel (FEMA Certification Performance)	**NO PROJECT ALTERNATIVE**	**ALTERNATIVE 2A** USACE-Selected Alternative	**ALTERNATIVE 2B** Expanded Incised Trapezoidal Channel (FEMA Certification Performance), Accommodate Upstream Bypass Channel	**ALTERNATIVE 4** Walled Trapezoidal Channel (FEMA Certification Performance)
KEY: (+) Impacts greater than for Proposed Project, **(=)** Impacts equal to Proposed Project, **(-)** Impacts less than for Proposed Project, **(NI)** No Impact, **(LS)** Less than Significant Impact, **(LM)** Less than Significant Impact with Mitigation, **(S)** Significant Impact, **(SU)** Significant and Unavoidable Impact * Although impacts associated with these resource types were determined to be less than significant, a mitigation measure is proposed, or a measure proposed to address another significant impact would further reduce this already LTS impact.					
Aesthetics	No significant impacts	**(-)** No significant impacts	No significant impacts	No significant impacts	No significant impacts
BIO-B: Compensate for Trees Removed During Construction*	✓		✓	✓	✓
Significance Determination Before Mitigation/After Mitigation	LS	NI	LS	LS	LS
Air Quality	NOx emissions above BAAQMD thresholds (AIR-2 and AIR-3)	**(-)** No significant impacts	**(=)** NOx emissions above BAAQMD thresholds (AIR-2 and AIR-3)	**(+)** NOx emissions above BAAQMD thresholds (AIR-2 and AIR-3)	**(+)** NOx emissions above BAAQMD thresholds (AIR-2 and AIR-3)
AIR-A. Reduce Construction Period Dust Emissions	✓		✓	✓	✓
AIR-B. Reduce Construction Equipment Emissions	✓		✓	✓	✓
Significance Determination Before Mitigation / After Mitigation	S / SU	NI	S / SU	S / SU	S / SU
Agriculture and Forestry	None	None	None	None	None
Significance (No Mitigation)	NI	NI	NI	NI	NI
Biological Resources	Adverse impacts on riparian habitat and healthy trees/shrubs (BIO-2).Adverse impacts on bird migration (Impact BIO-4). Conflict with policies in Milpitas Tree Ordinance (BIO-5)	**(-)** No significant impacts	**(=)** Adverse impacts on riparian habitat and healthy trees/shrubs (BIO-2). Adverse impacts on bird migration (Impact BIO-4). Conflict with policies in Milpitas Tree Ordinance (BIO-5)	**(+)** Adverse impacts on riparian habitat and healthy trees/shrubs (BIO-2). Adverse impacts on bird migration (Impact BIO-4). Conflict with policies in Milpitas Tree Ordinance (BIO-5)	**(+)** Adverse impacts on riparian habitat and healthy trees/shrubs (BIO-2). Adverse impacts on bird migration (Impact BIO-4). Conflict with policies in Milpitas Tree Ordinance (BIO-5)

ENVIRONMENTAL RESOURCE	**PROPOSED PROJECT** Widened Trapezoidal Channel (FEMA Certification Performance)	**NO PROJECT ALTERNATIVE**	**ALTERNATIVE 2A** USACE-Selected Alternative	**ALTERNATIVE 2B** Expanded Incised Trapezoidal Channel (FEMA Certification Performance), Accommodate Upstream Bypass Channel	**ALTERNATIVE 4** Walled Trapezoidal Channel (FEMA Certification Performance)
BIO-A. Perform Pre-Construction Nesting Bird Surveys	✓		✓	✓	✓
BIO-B. Compensate for Trees and Shrubs Removed During Construction	✓		✓	✓	✓
BIO-C. Use native grasses and forbs to hydroseed disturbed areas.	✓		✓	✓	✓
BIO-D. Provide Buffers Around Riparian Trees	✓		✓	✓	✓
Significance Determination Before Mitigation / After Mitigation	S / LM	NI	S / LM	S / LM	S / LM
Cultural Resources	Adverse impact on historical/archaeological site CA-SCL-593 (Impact CUL-1 and CUL-2) Potential adverse impacts on unknown cultural resources and human remains (CUL-4)	**(=)** No significant impacts	**(=)** Adverse impact on historical/archaeological site CA-SCL-593 (Impact CUL-1 and CUL-2). Potential adverse impacts on unknown cultural resources and human remains (CUL-2 and CUL-4)	**(+)** Adverse impact on historical/archaeological site CA-SCL-593 (Impact CUL-1and CUL -2).Potential adverse impacts on unknown cultural resources and human remains (CUL-2 and CUL-4)	**(+)** Adverse impact on archeological site CA-SCL-593 (Impact CUL-1 and CUL-2). Potential adverse impacts on unknown cultural resources and human remains (CUL-2 and CUL-4)
CUL-A. Implement the CA-SCL-593 MOA and HPMP	✓	✓	✓	✓	✓
CUL-B. Archaeological Monitoring and Unanticipated Discovery Plan	✓		✓	✓	✓
Significance Determination Before Mitigation / After Mitigation	S / LM	S / LM	S / LM	S / LM	S / LM
Geology, Soils, and Mineral Resources	Potential to expose structures or engineered slopes to adverse effects from seismic ground shaking (GEO-1). Potential for soil erosion or loss of topsoil (GEO-2)	**(-)** No significant impacts	**(-)** Potential to expose structures or engineered slopes to adverse effects from seismic ground shaking (GEO-1). Potential for soil erosion or loss of topsoil (GEO-2)	**(+)** Potential to expose structures or engineered slopes to adverse effects from seismic ground shaking (GEO-1). Potential for soil erosion or loss of topsoil (GEO-2)	**(+)** Potential to expose structures or engineered slopes to adverse effects from seismic ground shaking (GEO-1). Potential for soil erosion or loss of topsoil (GEO-2)
GEO-A. Implement Geotechnical Recommendations	✓		✓	✓	✓

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WAQ-C. Prepare and Implement a Rain Event Action Plan	✓		✓	✓	✓
Significance Determination Before Mitigation / After Mitigation	S / LM	LS	S / LM	S / LM	S / LM
Greenhouse Gases and Energy Use	Emissions of GHGs in excess of SMAQMD threshold (GHG-1)	**(-)** No significant impacts	**(=)** Emissions of GHGS in excess of SMAQMD threshold (GHG-1)	**(+)** Emissions of GHGs in excess of SMAQMD threshold (GHG-1)	**(+)** Emissions of GHGs in excess of SMAQMD threshold (GHG-1)
AIR-A. Reduce Construction Period Dust Emissions	✓		✓	✓	✓
AIR-B. Reduce Construction Equipment Emissions	✓		✓	✓	✓
Significance Determination Before Mitigation / After Mitigation	S / SU	NI	S / SU	S / SU	S / SU
Hazardous Materials	Potential for accidental spills or exposure to contaminated groundwater (HWM-1). Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment (HWM-2)	**(-)** No significant impacts	**(-)** Potential for accidental spills or exposure to contaminated groundwater (HWM-1). Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment (HWM-2)	**(+)** Potential for accidental spills or exposure to contaminated groundwater (HWM-1). Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment (HWM-2)	**(+)** Potential for accidental spills or exposure to contaminated groundwater (HWM-1). Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment (HWM-2)
HWM-A. Prepare and Implement Spill Prevention and Response Plan (SPRP)	✓		✓	✓	✓
HWM-B. Prepare and Implement Emergency Evacuation Plan	✓		✓	✓	✓
HWM-C. Treat VOC-Contaminated Groundwater Encountered at JCI Off-Site Area.	✓		✓	✓	✓

ENVIRONMENTAL RESOURCE	**PROPOSED PROJECT** Widened Trapezoidal Channel (FEMA Certification Performance)	**NO PROJECT ALTERNATIVE**	**ALTERNATIVE 2A** USACE Selected-Alternative	**ALTERNATIVE 2B** Expanded Incised Trapezoidal Channel (FEMA Certification Performance), Accommodate Upstream Bypass Channel	**ALTERNATIVE 4** Walled Trapezoidal Channel (FEMA Certification Performance)
TRA-A: Prepare and Implement a Transportation Management Plan*	✓		✓	✓	✓
WAQ-C. Prepare and Implement a Rain Event Action Plan*	✓		✓	✓	✓
Significance Determination Before Mitigation / After Mitigation	S / LM	NI	S / LM	S / LM	S / LM
Land Use and Planning	Conflict with Milpitas Trails Master Plan (LND-2)	(-= No significant impacts	**(=)** Conflict with Milpitas Trails Master Plan (LND-2)	**(+)** Conflict with Milpitas Trails Master Plan (LND-2)	**(+)** Conflict with Milpitas Trails Master Plan (LND-2)
LND-A: Allow Public Access to Creek Right of Way	✓		✓	✓	
Significance Determination Before Mitigation / After Mitigation	S / LM	NI	S / LM	S / LM	S / LM
Noise	Short-term exceedance of local noise standards (NOI-1) and substantial temporary increase in noise levels (NOI-4)	**(-)** No significant impacts	**(=)** Short-term exceedance of local noise standards (NOI-1) and substantial temporary increase in noise levels (NOI-4)	**(+)** Short-term exceedance of local noise standards (NOI-1) and substantial temporary increase in noise levels (NOI-4)	**(+)** Short-term exceedance of local noise standards (NOI-1) and substantial temporary increase in noise levels (NOI-4)
NOI-A. Alert Neighbors	✓		✓	✓	✓
NOI-B. Use Noise Suppression Techniques	✓		✓	✓	✓
NOI-C. Limit Construction Hours	✓		✓	✓	✓
Significance Determination Before Mitigation / After Mitigation	S / SU	LS	S / SU	S / SU	S / SU
Population and Housing	No significant impacts	**(=)** No significant impacts	**(=)** No significant impacts	**(=)** No significant impacts	**(=)** No significant impacts
Significance (No Mitigation)	LS	NI	LS	LS	LS

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Public Services	No significant impacts	**(=)** No significant impacts	**(+)** No significant impacts	**(+)** Adversely affect response times of emergency vehicles (PBS-1)	**(+)** Adversely affect response times of emergency vehicles (PBS-1)
TRA-A: Prepare and Implement a Transportation Management Plan*	✓		✓	✓	✓
Significance Determination Before Mitigation / After Mitigation	LS	LS	LS	S / LM	S / LM
Recreation	No significant impacts	**(-)** No significant impacts	**(=)** No significant impacts	**(=)** No significant impacts	**(=)** No significant impacts
REC-A. Detour Signage for Pedestrians and Cyclists*	✓		✓	✓	✓
LND-A: Allow Public Access to Creek R~~r~~ight of W~~w~~ay*	✓		✓	✓	
Significance Determination Before Mitigation / After Mitigation	LS	LS	LS	LS	LS
Transportation and Traffic	Conflict with a plan ordinance or policy establishing measures of effectiveness for performance of the circulation system (TRA-1). Hazards design features or construction vehicles (TRA-4). Inadequate emergency access (TRA-5). Conflict with plan or policy regarding public transit, bicycle, or pedestrian facilities (TRA-6).	**(-)** No significant impacts	**(=)** Conflict with a plan ordinance or policy establishing measures of effectiveness for performance of the circulation system (TRA-1). Hazards design features or construction vehicles (TRA-4). Inadequate emergency access (TRA-5). Conflict with plan or policy regarding public transit, bicycle, or pedestrian facilities (TRA-6).	**(+)** Conflict with a plan ordinance or policy establishing measures of effectiveness for performance of the circulation system (TRA-1). Hazards design features or construction vehicles (TRA-4). Inadequate emergency access (TRA-5). Conflict with plan or policy regarding public transit, bicycle, or pedestrian facilities (TRA-6).	**(+)** Conflict with a plan ordinance or policy establishing measures of effectiveness for performance of the circulation system (TRA-1). Hazards design features or construction vehicles (TRA-4). Inadequate emergency access (TRA-5). Conflict with plan or policy regarding public transit, bicycle, or pedestrian facilities (TRA-6).
TRA-A. Prepare and Implement a Traffic Management Plan	✓		✓	✓	✓

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HWM-B. Prepare and Implement Emergency Evacuation Plan*	✓		✓	✓	✓
Significance Determination Before Mitigation / After Mitigation	S / LM	LS	S / LM	S / LM	S / LM
Utility and Service Systems	Contaminated groundwater may exceed RWQCB water quality standards (UTL-1)	**(-)** No significant impacts	**(=)** Contaminated groundwater may exceed RWQCB water quality standards (UTL-1)	**(+)** Contaminated groundwater may exceed RWQCB water quality standards (UTL-1)	**(+)** Contaminated groundwater may exceed RWQCB water quality standards (UTL-1)
HWM-C. Treat VOC–contaminated Groundwater Encountered at JCI Off-site Area*	✓		✓	✓	✓
Significance Determination Before Mitigation / After Mitigation	S / LM	LS	S / LM	S / LM	S / LM
Hydrology and Water Quality	Significant water quality impacts from spills of hazardous materials, contaminated groundwater, and creek dewatering (WAQ-1, WAQ-5, and WAQ-6)	**(-)** No significant impacts	**(+)** Significant water quality impacts from spills of hazardous materials, contaminated groundwater, and creek dewatering (WAQ-1, WAQ-5, and WAQ-6)	**(+)** Significant water quality impacts from spills of hazardous materials, contaminated groundwater, and creek dewatering (WAQ-1, WAQ-5, and WAQ-6)	**(+)** Significant water quality impacts from spills of hazardous materials, contaminated groundwater, and creek dewatering (WAQ-1, WAQ-5, and WAQ-6)
WAQ-A. Implement Measures for Reducing Erosion and Protecting Water Quality	✓		✓	✓	✓
WAQ-B. Prepare and Implement a Dewatering Plan	✓		✓	✓	✓
WAQ-C. Prepare and Implement a Rain Event Action Plan	✓		✓	✓	✓
HWM-A. Prepare and Implement a Spill Prevention and Response Plan*	✓		✓	✓	✓
HWM-C. Treat VOC-contaminated groundwater encountered at the JCI off-site area*	✓		✓	✓	✓

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Significance Determination Before Mitigation/After Mitigation	S / LM	LS	S / LM	S / LM	S / LM

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ACRONYMS AND ABBREVIATIONS

ACE	Annual Chance of Exceedance
AQMP	Air Quality Management Plan
AST	Above-ground storage tanks
BAAQMD	Bay Area Air Quality Management District
BART	Bay Area Rapid Transit
Bgs	Below ground surface
BMP	Best Management Practices
BP	Before present
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standard
Cal-OSHA	California Occupational Safety and Health Administration
Caltrans	California Department of Transportation
CAP	Clean Air Plan
CAR	Coordination Act Report
CARB	California Air Resources Board
CBC	California Building Code
CCAA	California Clean Air Act
CCCR	Citizens Committee to Complete the Refuge
CCR	California Code of Regulations
CDC	California Department of Conservation
CDF	California Department of Forestry
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act of 1970
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CGS	California Geologic Survey
CHP	California Highway Patrol
CMP	Congestion Management Plan
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CO	Carbon monoxide
CO2e	Carbon dioxide equivalent
CRAM	California Rapid Assessment Method
CRHR	California Register of Historical Resources
CWA	Clean Water Act
Cy	Cubic yards
dB	Decibels
DCA	Dichloroethane
DCE	Dichloroethene
DEH	Santa Clara Department of Environmental Health
DEIR	Draft Environmental Impact Report
DTSC	California Department of Toxic Substances Control
DWR	Department of Water Resources
EIR	Environmental Impact Report
EIS	Environmental Impact Statement

EPA	U.S. Environmental Protection Agency
ERD	Enhanced reduction dechlorination
ESA	Endangered Species Act
ESL	Environmental Screening Levels
EV	Electron volt
Fed-OSHA	Federal Occupational Safety and Health Administration
FEIR	Final Environmental Impact Report
FEMA	Federal Emergency Management Agency
FHA	Federal Highway Administration
FHWA	Federal Highway Administration
Foot/Ft	Feet per Feet
FWCA	Fish and Wildlife Coordination Act
GHG	Greenhouse Gas
GIS	Geographical Information Systems
GRR-EIS	General Reevaluation Report/Environmental Impact Statement
GWETS	Groundwater extraction and treatment system
HCP	Habitat Conservation Plan
HOV	High-occupancy vehicle
HPMP	Historic Property Management Plan
HTRW	Hazardous, toxic, and radiological waste
JCI	Jones Chemical, Inc. Site
JUA	Joint Use Agreement
Ldn	Day-night average sound level
LEDPA	Least Environmentally Damaging Practicable Alternative
LOS	Level of Service
LRT	Light Rail Transit
LS	Less than Significant
MBTA	Migratory Bird Treaty Act
MLD	Most Likely Descendant
MMRP	Mitigation Monitoring and Reporting Program
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MSL	Mean Sea Level
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NAT	North American Transformer Site
NCCPs	Natural Community Conservation Plans
NEPA	National Environmental Policy Act
NER	National Ecosystem Restoration
NFIP	National Flood Insurance Program
NHPA	National Historic Preservation Act
NI	No Impact
NMFS	National Marine Fisheries Service
NO_2	Nitrogen dioxide
NOI	Notice of Intent
NOP	Notice of Preparation
NOx	Nitrogen oxides

NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
O_3	Ozone
OHP	Office of Historic Preservation
OHWM	Ordinary High Water Mark
OSHA	Occupational Safety and Health Administration
PCE	Perchloroethylene
PELS	Permissible Exposure Limits
PG&E	Pacific Gas and Electric
PID	Photoionization detector
PM_{10}, $PM_{2.5}$	Particulate matter
Ppm	Parts per million
PRC	Public Resources Code
REAP	Rain Event Action Plan
ROG	Reactive organic gases
RWQCB	Regional Water Quality Control Board
SCVWD or the District	Santa Clara Valley Water District
SFBRWQCB	San Francisco Bay Region Water Quality Control Board
SGMP	Soil and Groundwater Management Plan
SIP	State Implementation Plans
SM	Less than Significant with Mitigation
SMP	Stream Maintenance Plan
SO_2	Sulfur dioxide
STELs	Short-term Exposure Limits
SU	Significant, Unavoidable
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TCA	Trichloroethane
TCE	Trichloroethylene
TWA	time-weighted average
μg/m3	Micrograms per cubic meter
UPRR	Union Pacific Railroad
USA North	Underground Service Alert Northern California

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1. INTRODUCTION

This ~~Draft~~ Final Environmental Impact Report (~~D~~FEIR) identifies the possible environmental impacts associated with implementing the Upper Berryessa Creek Flood Risk Management Project (proposed project). This ~~D~~FEIR~~EIR~~ has been prepared to comply with the California Environmental Quality Act (CEQA), which requires that all state and local governmental agencies consider the environmental consequences of programs and projects over which they have discretionary authority before taking action. CEQA requires preparation of an EIR to inform agencies and the public of significant environmental effects associated with a proposed project, to identify ways to minimize significant effects of the project, and to describe reasonable alternatives to the project that would avoid or reduce the project's significant effects (CEQA Guidelines, Section 15121(a)).

The Santa Clara Valley Water District (the District) is the primary water resources agency for Santa Clara County (the County). The District is charged with local flood protection in the 322-square-mile Coyote Creek Watershed, the largest of the County's five watersheds. Berryessa Creek is one of the major waterways draining this watershed, and carries runoff from undeveloped areas east of the I-680 Freeway, through developed neighborhoods, commercial areas, and industrial areas before it enters San Francisco Bay. The District is cooperating with the U.S. Army Corps of Engineers (USACE) in implementing the proposed project. USACE is responsible for project design, construction, and initial maintenance of the improvements. The District is partially funding the project; cooperating with USACE in project planning and design; providing all necessary lands, easements, rights-of-way, and other land rights for project construction, and long-term maintenance of the constructed improvements.

To fulfill requirements of the National Environmental Policy Act (NEPA), USACE prepared a Final General Reevaluation and Environmental Impact Statement (GRR-EIS) for the project in early 2014 (USACE 2014), in which it evaluated a range of five alternatives for the Upper Berryessa Creek flood risk management project, including a No Action Alternative. These alternatives are identified in Table 1.1.

Table 1.1 Final Array of Alternative Plans Assessed in USACE GRR/EIS

Alternative	Description
1	No Action
2A	Incised Trapezoidal Channel (Moderate Protection)
2B	Incised Trapezoidal Channel (NFIP-Certification Protection)
4	Walled Trapezoidal Channel (NFIP-Certification Protection)
5	1990 Authorized Project

Alternative 5 is the project authorized by Congress in the Water Resources Development Act of 1990. The 1990 authorized project included channel improvements to about 3.3 miles of Berryessa Creek upstream of I-680. In response to concerns that the improvements upstream of I-680 would be environmentally harmful and economically unjustified, USACE undertook a General Re-evaluation in 2012, which resulted in preparation of the 2014 GRR-EIS document (USACE 2014). The GRR-EIS explored a number of alternatives to the authorized project and included detailed analysis of the short list of alternatives listed in Table 1.1. These alternatives were intended to provide a range of flood protection, recreational benefits, costs, and environmental protections. The alternatives included flood protection measures extending upstream beyond the limits of the proposed project. After evaluating the alternatives, the USACE selected Alternative 2A, which is intended to provide flood protection at the 1

percent annual chance of exceedance (ACE) or 100-year level. USACE completed the Final GRR/EIS in March 2014. In May 2014, the USACE Director of Civil Works approved the NEPA Record of Decision (ROD) and issued the Director's Report for the selected plan. The ROD states:

> The recommended plan is considered the environmentally preferred alternative. The recommended plan avoids or minimizes impacts to environmental resources to a greater extent than do the other alternatives, mainly due to a shorter construction period, while meeting the flood risk management purpose, although there would still be temporary disturbance of habitats and air quality in the construction area. Adverse environmental effects will be reduced to a less than significant level through project design, construction practices, preconstruction surveys and analysis, regulatory requirements and best management practices. All practicable means to avoid, minimize, and mitigate adverse environmental impacts were included in the plan formulation process and have been incorporated into the selected plan. Although the selected plan would not result in any long-term significant impacts, there would be short-term effects to air quality, water quality, wildlife, cultural resources, transportation and noise.
>
> Technical and economic criteria used in the formulation of alternative plans were those specified in the Water Resources Council's Economic and Environmental Principles and Guidelines for Water and Related Land Resource Implementation Studies. All applicable laws, executive orders, regulations, and guidelines were considered in the evaluation of alternatives and the selection of the recommended plan. Based on review of these evaluations, I find that the flood risk management and recreation benefits gained by construction of the recommended plan serve the public interest and outweigh any adverse effects. This ROD completes the National Environmental Policy Act process.

Alternative 2A (i.e. USACE-selected project) is similar to the proposed project and would protect against the 1 percent ACE event, but not with the 95 percent level of certainty required to meet certification standards of the Federal Emergency Management Agency (FEMA) National Flood Insurance Program (NFIP). Because the District wants the project to achieve FEMA certification, the District requested modification of the Alternative 2A design. The required design modification consists of increasing the length and height of the concrete floodwall located on the west bank of the creek in Reaches 2/3 and 4. In Reaches 2/3 the USACE-selected project (Alternative 2A) design includes a roughly 1,300 foot-long, 1.5 foot-high floodwall at this location; the proposed project would increase the length of the floodwall to about 2,200 feet, and increase the height to 2 feet above ground level. In Reach 4, both the proposed project and Alternative 2A include a completely buried, 450-ft long concrete floodwall. The modified Alternative 2A design is the proposed project analyzed in this FEIR.

1.1. PURPOSE OF THE EIR

According to CEQA, projects with significant environmental effects require preparation of an EIR that fully describes the environmental effects of a project (CEQA Guidelines §15064(a)(1)). An EIR is intended to provide information that allows the public to identify and evaluate potential environmental consequences of a proposed project, to identify mitigation measures to lessen or eliminate significant adverse impacts, and to examine feasible alternatives to the project. The final decision to approve, disapprove, or modify the proposed project is not made until the information contained in the EIR is reviewed and considered by the lead and responsible agencies.

CEQA states that a lead agency, in this case, the District, shall not “approve projects as proposed if there are feasible alternatives or feasible mitigation measures available which would substantially lessen the significant environmental effects of such projects…” (Public Resource Code § 21002). The lead agency shall neither approve nor implement a project as proposed unless the significant environmental effects of that project have been reduced to a less than significant level, essentially “eliminating, avoiding, or substantially lessening” the expected impacts (Public Resource Code § 21081). If the lead agency approves the project despite residual significant adverse impacts that cannot be mitigated to less than significant levels, the agency must state the reasons for its action in writing. This “statement of overriding considerations” must be included in the record of project approval.

The District determined that construction of the project could have a significant effect on the environment and ~~is~~ has therefore prepared~~ing~~ an EIR in compliance with CEQA. This ~~D~~EIR~~EIR~~ is intended to:

- Provide a complete description of the proposed project to the public;
- Inform the public of any significant impacts that could occur as a result of project implementation;
- Identify measures that would avoid, reduce, or mitigate any significant effects; and
- Describe and evaluate other alternatives that may feasibly accomplish the goals and objectives of the proposed project.

1.2. EIR PROCESS

1.2.1. Notice of Preparation and Scoping

On October 27, 2001, in accordance with Section 15082 of the CEQA Guidelines, the District, as the CEQA lead agency, prepared a Notice of Preparation (NOP) for this EIR. At the same time, the USACE prepared a Notice of Intent (NOI) as the lead agency under the National Environmental Policy Act (NEPA). The NOP contained a description of the project and a map of the project area, identified possible alternatives to the proposed project, and provided a summary of the probable environmental effects of the project to be addressed in the EIR. The NOP was mailed to 11 interested parties, including local and state agencies and to the State Clearinghouse. Copies of the NOP were made available for public review at the Santa Clara County Public Library in Milpitas and at the County Clerk’s office. The 30-day scoping period for the project occurred between October 27 and November 27, 2001. A public scoping meeting was held on November 7, 2001, at the City of Milpitas Police Department.

Two comment letters were received during the public scoping period. These letters, along with a copy of the NOP, are attached as Appendix A of this EIR. Because of the relatively long period of time that elapsed between the issuance of the NOP and the preparation of this ~~D~~EIR, the District attempted to contact the original comment authors to allow them to update their comments. One of the commenting agencies, Streams for Tomorrow, could not be reached. The other commenting agency, California Department of Transportation (Caltrans), responded by sending a letter that it had sent to the USACE during the public review process for its EIS, which occurred in 2014. This letter is also attached as part of Appendix A.

1.2.2. Preparation of Draft EIR

The~~is~~ DEIR ~~will be~~was made available by the District for review and comment by the public and other interested parties, agencies, and organizations for a 49~~5~~-day period ~~starting on~~of September 25, 2015 to

November 12, 2015. A notice of completion (NOC) was sent to regulatory agencies, state and local government agencies, non-profit organizations, private citizens, and other entities that expressed an interest or which may have an interest in the project.

During the public comment period, written comments ~~on the adequacy of the DEIR may be submitted toDistrict~~were submitted to:

James Manitakos
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

Comments ~~may be~~were also submitted electronically ~~by November 12, 2015~~at the District website at www.valleywater.org. All comment letters and emailed comments have been compiled and are presented in Appendix G.

1.2.3. Final EIR

All comments on environmental issues received during the DEIR public review period ~~will~~ have been addressed in a "response to comments" ~~document~~section (Chapter 7), which has been added in its entirety to the DEIR. ~~which, together with a revised DEIR, will constitute the Final EIR.~~ The response to comments document ~~will also~~ presents any changes to the DEIR resulting from public and agency input. This~~e~~ ~~Final EIR (~~FEIR~~)~~ ~~will~~ incorporates all changes to the DEIR from public and agency input, as well as staff-initiated text changes. Revisions to the DEIR are tracked in this FEIR by including strikethrough lines for deleted text and colored text for additions.

Prior to any decision to approve, revise, or reject the project, the District's Board of Directors will review the FEIR and consider EIR certification at a regularly scheduled board meeting. Upon EIR certification, the District may proceed with project approval actions. Approval of the project would be preceded by written findings for each significant adverse environmental effect identified in the EIR (CEQA Guidelines §15091). At the time that CEQA findings are adopted, the District will also adopt a Mitigation Monitoring and Reporting Program (MMRP) for adopted mitigation measures (further discussed below).

1.2.4. Mitigation, Monitoring, and Reporting

California law requires lead agencies to adopt an MMRP for mitigation measures that have been identified as necessary to reduce or avoid significant effects on the environment, and which will become conditions of program approval. All measures proposed for adoption have been included in the MMRP to ensure CEQA compliance during program implementation (CEQA Guidelines §15097 (a)).

1.3. ORGANIZATION OF THE EIR

This report has been organized into seven chapters and six appendices.

CHAPTER 1 INTRODUCTION provides an overview of the purpose of an ~~D~~EIR and the process of preparing the ~~D~~EIR ~~and subsequent FEIR~~. Reports previously prepared in relation to Berryessa Creek are also reviewed.

CHAPTER 2 PROJECT DESCRIPTION describes the project in terms of its original authorization, purpose, current configuration and uses. The purpose and need for the proposed project are described, along with the conceptual actions that could be undertaken to achieve the purpose and objectives. The Proposed Project, which is the project selected from among the alternatives analyzed, is presented in detail.

CHAPTER 3 ENVIRONMENTAL SETTING, IMPACTS, AND MITIGATION MEASURES presents the existing environmental conditions throughout the project area. It then provides analysis of significant adverse effects of the proposed project and describes mitigation measures to avoid or reduce significant environmental impacts. Environmental conditions assessed and analyzed for impacts include aesthetics, air quality, agriculture and forestry, biological resources, climate change, cultural resources, geology, hazardous materials, land use and planning, noise, population and housing, public services, recreation, transportation, and utilities and service systems, and water resources.

CHAPTER 4 CUMULATIVE IMPACTS ANALYSIS describes the cumulative effects on the surrounding area that would result from the combination of the proposed project with other ongoing probable future projects in the area and determines whether the proposed project's incremental impacts would be cumulatively considerable.

CHAPTER 5 ALTERNATIVES ANALYSIS describes the alternatives to the proposed project, including the No Project Alternative and three other action alternatives, and analyzes the potential impacts that could result from their implementation.

CHAPTER 6 OTHER STATUTORY CONSIDERATIONS presents analyses required by CEQA for additional impacts of the alternatives, including growth-inducing impacts, unavoidable significant impacts, and significant irreversible changes to existing resources.

CHAPTER 7 ~~Name~~ **~~HERE~~PUBLIC COMMENTS AND DISTRICT RESPONSES TO THE DRAFT EIR** presents the comments submitted by regulatory and planning agencies, local governments, and non-profit organizations during the public review period, and the District's responses to those comments.

CHAPTER 8 AGENCIES AND PERSONS CONTACTED, REFERENCES AND LITERATURE CITED, AND REPORT PREPARERS lists the persons and agencies contacted during preparation of this EIR, references for cited literature, and the report preparers.

APPENDICES:

- Appendix A Public Comments and Notice of Preparation
- Appendix B Air Quality Data Sheets
- Appendix C Wetlands/ Other Waters of the U.S. / Waters of the State Delineation Report
- Appendix D Geotechnical Report
- Appendix E Hazardous Toxic, and Radioactive Waste (HTRW) Soil Sampling Report
- Appendix F Tree and Shrub Survey Report
- Appendix G Public Comments on the DEIR
- Appendix H Draft Groundwater Management Plan

1.4. PREVIOUS REPORTS

Reports prepared in association with this project, or other portions of Berryessa Creek or its tributaries, are included in the list below in chronological order.

Gill and Pulver Engineers, Inc. 1982. Berryessa Creek Preliminary Design Summary Report and Cost Estimate.

Santa Clara Valley Water District. 1982. Lower Penitencia Creek Planning Study (Coyote Creek to Montague Expressway).

Gill and Pulver Engineers, Inc. 1983. Section 205 Draft Report for Flood Control on Berryessa Creek, San Jose, Milpitas, Santa Clara County, California. Preliminary Designs for Channel Modifications (Old Piedmont Road to Calaveras Boulevard).

U.S. Army Corps of Engineers, Sacramento District. 1983. Section 205 Draft Report for Flood Control on Berryessa Creek, San Jose, Milpitas, and Santa Clara County, California. Preliminary Designs for Channel Modifications (Old Piedmont Road to Calaveras Boulevard).

U.S. Army Corps of Engineers, Sacramento District. 1984. Concrete Materials. Berryessa Creek, California.

U.S. Army Corps of Engineers, San Francisco District. 1987. Interim Feasibility Report and Environmental Impact Statement, Coyote Creek and Berryessa Creek, Santa Clara County, California.

Harvey and Stanley Associates, Inc., and Kinetic Laboratories, Inc. 1988. Lower Coyote Creek Fisheries Evaluation.

Northwest Hydraulics Consultants Inc. 1990. HEC-2 Data Deck Development, Berryessa Creek, Santa Clara County, California.

Northwest Hydraulic Consultants Inc. 1990. Sediment Engineering Investigation and Preliminary Hydraulic Design of the Berryessa Creek Flood-Control Project. U.S. Army Corps of Engineers, Sacramento District. 1993. Draft General Design Memorandum, Coyote and Berryessa Creeks, Volume I of II (Berryessa Creek), California.

U.S. Army Corps of Engineers, Sacramento District. 1993. Draft General Design Memorandum, Coyote and Berryessa Creeks, Volume II of II, California.

U.S. Army Corps of Engineers, Sacramento District. 1994. Value Engineering Study on Coyote and Berryessa Creeks, Berryessa Creek Element, Santa Clara County, California.

Kennedy/Jenks Consultants. 1996. Phase II Hazardous Materials Investigation, Calaveras Boulevard to Old Piedmont Road, Berryessa Creek Flood Control Project.

Kennedy/Jenks Consultants. 1996. Preliminary Health Risk Assessment, Berryessa Creek Flood Control Project.

Harvey, H.T. and Associates. 1997. Santa Clara Valley Water District: California Red-Legged Frog Distribution and Status.

City of Milpitas. 2000. Berryessa Creek Trail and Coyote Creek Trail Feasibility Report. May 2000

U.S. Army Corps of Engineers, Sacramento District. 2005. Value Engineering Report, Berryessa Creek Flood Control Project, Santa Clara County, California.

Dowling Associates. 2008. Existing Conditions Report for Berryessa Creek Modifications Traffic Analysis. Prepared for Tetra Tech.

Santa Clara Water Valley District. 2011. Lower Berryessa Creek Program. Final Environmental Impact Report SCH #2007092084. Prepared by ESA Associates.

Kittelson and Associates. May 2012. Traffic Analysis Report for Berryessa Creek Modifications. Prepared for USACE San Francisco District.

U.S. Army Corps of Engineers, Sacramento District. 2014. Berryessa Creek Element, Coyote and Berryessa Creek Flood Control Project, Santa Clara County California. Final General Reevaluation Report and Environmental Impact Statement.

U.S. Army Corps of Engineers, Sacramento District. 2014. Record of Decision. Berryessa Creek Project, Santa Clara County California.

U.S. Army Corps of Engineers. Secretary of the Army. 2014. Directors Report for the Berryessa Creek Element of the Coyote and Berryessa Creeks, Santa Clara County California. Memorandum for Assistant Secretary of the Army (Civil Works).

U.S. Army Corps of Engineers and California State Historic Preservation Office. 2014. Memorandum of Agreement between U.S. Army Corps of Engineers and California State Historic Preservation Office, Regarding Resolution of Adverse Effects for the Proposed Berryessa Creek Flood Control Project.

Basin Research Associates. December 2015. Upper Berryessa Creek Flood Risk Management Improvements Field Summary of Archaeological Phase 1 Testing and Burial Removal.

Tetra Tech. 2015a. Wetland and Vegetation Survey of the Upper Berryessa Creek Project Area. Prepared for Santa Clara Valley Water District. Update to 2014 Wetland and Vegetation Survey of Upper Berryessa Creek Project Area.

Tetra Tech. 2015b. Geotechnical Report. Upper Berryessa Creek Flood Risk Management Project. I-680 to Calaveras Boulevard. Santa Clara County, Milpitas, CA. Prepared for Santa Clara Valley Water District.

Tetra Tech. 2015c. HTRW Soil Sampling Report. Upper Berryessa Creek Flood Risk Management Project between Montague Expressway and Yosemite Drive. Santa Clara County. Milpitas, CA. Prepared for Santa Clara Valley Water District, San Jose, CA.

Tetra Tech. 2015d. HTRW Soil Sampling Report. Upper Berryessa Creek Flood Risk Management Project Between Montague Expressway and Yosemite Drive. Santa Clara County. Milpitas, CA. Prepared for Santa Clara Valley Water District, San Jose, CA.

Tetra Tech. 2015e. 60% Design Plans for the Upper Berryessa Creek Flood Risk Management Project. Prepared for Santa Clara Valley Water District.

Tetra Tech. 2015f. Final 60% Design Documentation Report for the Upper Berryessa Creek Flood Risk Management Project. Prepared for Santa Clara Valley Water District.

Tetra Tech. 2015g. Sediment Transport Analysis Report for the Upper Berryessa Creek Flood Risk Management Project. Prepared for Santa Clara Valley Water District.

Tetra Tech. 2015h. Draft Groundwater Management Plan Upper Berryessa Creek Flood Risk Management Project Jones Chemical Inc. Plume Area, Milpitas, Santa Clara County, California.

2. PROJECT DESCRIPTION

2.1. INTRODUCTION

This ~~D~~FEIR addresses potential impacts of the proposed Upper Berryessa Creek Flood Risk Management Project within the cities of Milpitas and San Jose (Figure 2.1). Proposed channel modifications include flood risk improvements along 2.2 miles of Upper Berryessa Creek.

As the primary water resources agency for Santa Clara County, the District provides water-related services including wholesale distribution of potable water, stream maintenance, and flood protection throughout Santa Clara County. In order to alleviate flooding in the Upper Berryessa Creek area, the District is proposing flood risk management measures that would provide protection from the 100-year flood (also referred to as the 1 percent recurrence flow).

The proposed project was originally authorized for study under the Water Resources Development Act of 1990, and engineering and design studies were prepared by the USACE in 1993. These designs were viewed unfavorably by the local community due to the high cost of the project and the concrete channel features. In 2001, the District signed a Re-evaluation Cost-Sharing Agreement with the USACE to initiate an effort to find a more environmentally acceptable solution.

As part of the process of studying the feasibility of the proposed project and its alternatives, the USACE prepared the Berryessa Creek Integrated General Reevaluation Report and Environmental Impact Statement (USACE 2014). The GRR/EIS documents the planning and evaluation process that identified the USACE's preferred alternative, the results of hydraulic, economic, geotechnical, and other studies that informed the process, and the potential environmental impacts that could occur during construction and operation of the proposed project. As the GRR/EIS has been finalized, the USACE intends to implement the selected project (i.e. Alternative 2A) with improvements sought by the local partner. The proposed project consists of the USACE-selected project with modifications that would increase the level of flood protection to meet FEMA certification standards. The design modification to the USACE-selected project required to meet FEMA certification is increasing the length and height of a concrete floodwall located on the west bank of the creek in Reaches 2 and 3. The USACE-selected project includes a roughly 1,300 foot-long floodwall at this location; the proposed project would increase the length of the floodwall to about 2,200 feet. The maximum height of the floodwall would be 2 feet above ground level.

The District and USACE have formed a partnership to plan and eventually implement the proposed project following CEQA review. The USACE is the project lead and the District is the local partner (the USACE and the District are collectively referred to as project sponsors in this FEIR). USACE would be responsible for contracting and oversight of construction activities and the District would be responsible for acquiring real property needed for the project (including temporary and permanent easements), making real property owned or to be acquired by the District for the project available for construction, and operating and maintaining the creek channel after construction is complete. In July of 2014, the District and the USACE signed a Design Agreement, with the District as the Non-Federal Interest (SCVWD 2014). USACE would be responsible for project design, construction, and initial maintenance of the improvements. The District would partially fund the project; cooperate with USACE in project planning and design; provide all necessary lands, easements, rights-of-way, and other land rights for project construction, and maintain the constructed improvements in the long term. Both partners also committed to appointing senior representatives to a Design Coordination Team, which meets regularly and makes recommendations to the District Engineer on matters related to the project.

2.2. PROJECT LOCATION AND EXISTING FACILITIES

The Berryessa Creek drainage basin covers 22.4 square miles in northeastern Santa Clara County (Figure 2.2). Berryessa Creek flows westerly from its origin in the Los Buellis Hills in the Diablo Range through the cities of Milpitas and San Jose. It then turns north and flows into Lower Penitencia Creek, a tributary to Coyote Creek, which in turn flows into southern San Francisco Bay. The upper watershed in the Diablo Range has steep mountainous areas with clay surface soils that are highly erodible and subject to slope failure, settlement, and transport of sediments downstream. The upper watershed is primarily in recreation, conservation, agricultural or mining use. The lower basin consists of a large proportion of flat valley and hill areas that have been urbanized and channelized where sediment from the upper watershed is delivered and deposited.

This chapter describes Berryessa Creek both upstream and downstream of the project area. Upstream of the project area, the creek flows west out of the Buellis Hills and runs through a steep ravine surrounded by grazing land. The creek and ravine have a well-developed riparian zone, including mature sycamore and eucalyptus trees. At Old Piedmont Road, the creek emerges from the ravine and enters a predominantly residential section of San Jose to Piedmont Road.

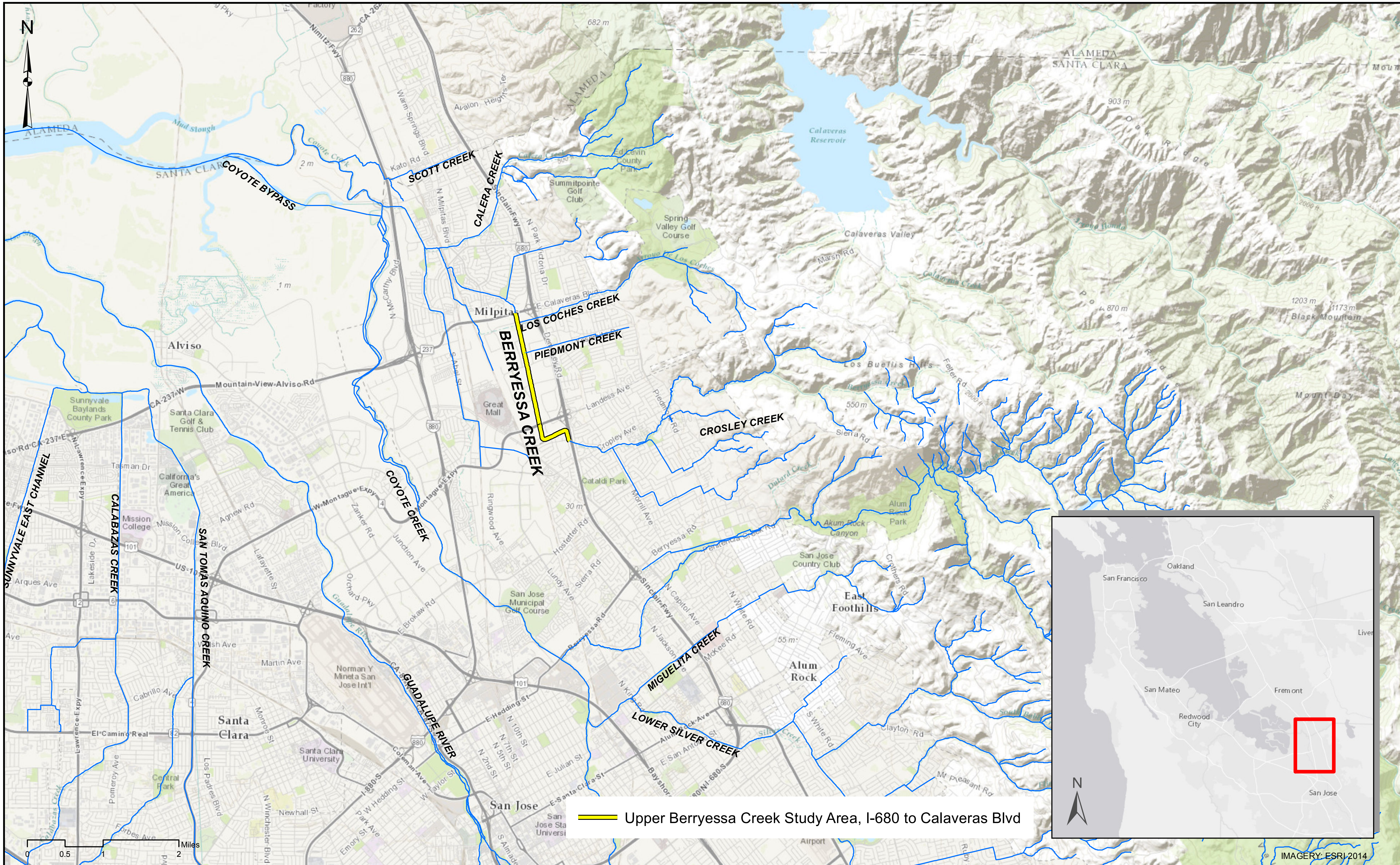

Figure 2.1 Project Location & Vicinity

Tetra Tech
17885 Von Karman Avenue, Suite 500
Irvine, CA 92614
Tel. (949) 809-5000 Fax. (949) 809-5003

Santa Clara Valley Water District

UPPER BERRYESSA CREEK
FLOOD RISK MANAGEMENT PROJECT

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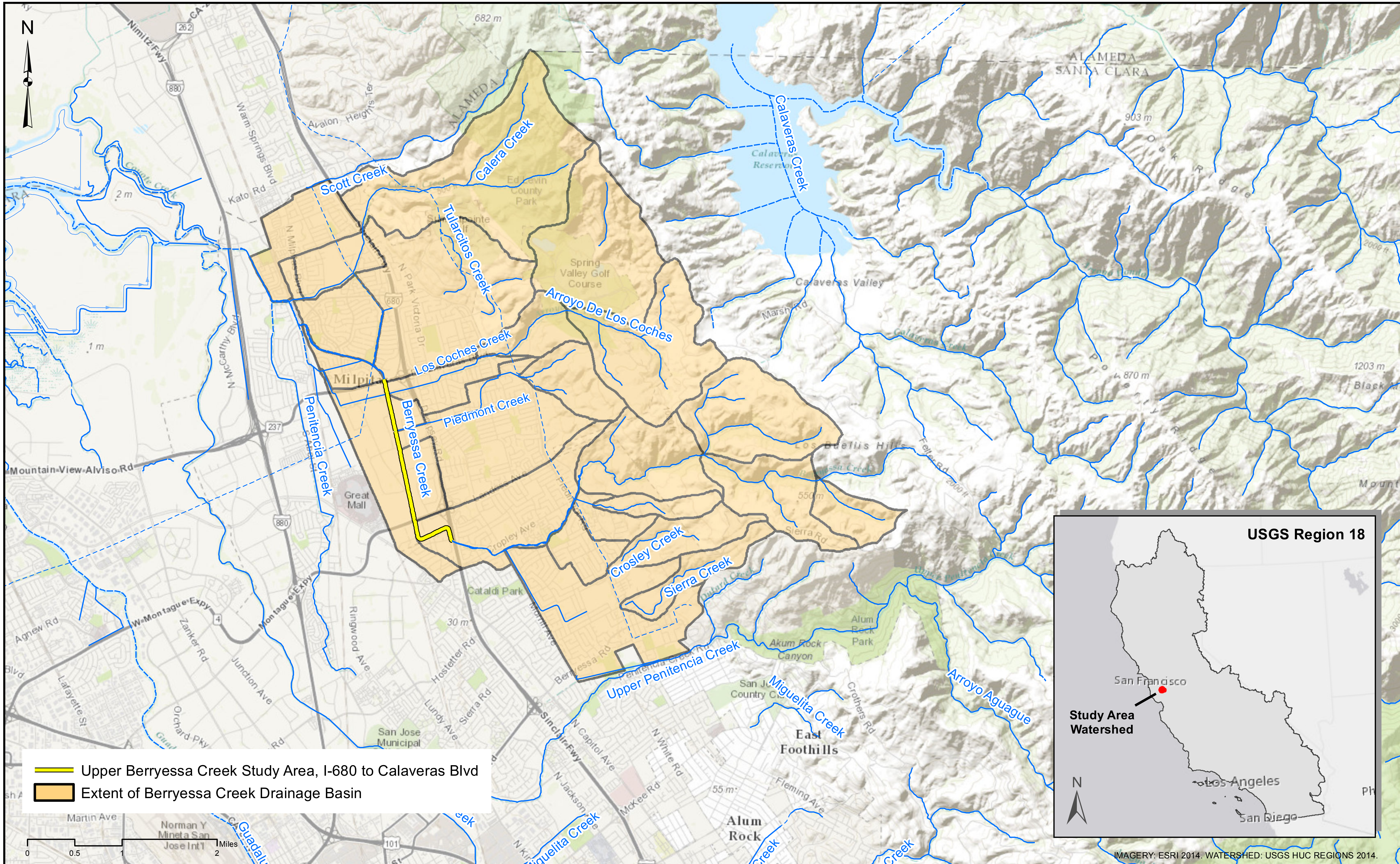

Figure 2.2 - Berryessa Creek Drainage Basin

Tetra Tech
17885 Von Karman Avenue, Suite 500
Irvine, CA 92614
Tel. (949) 809-5000 Fax. (949) 809-5003

Santa Clara Valley Water District

UPPER BERRYESSA CREEK
FLOOD RISK MANAGEMENT PROJECT

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From Piedmont Road to Morill Avenue, the creek flows through a riparian greenbelt known as Berryessa Creek Park. Downstream of Morill Avenue, the creek continues to flow west through earth and concrete-lined channels maintained by the District. The creek then abruptly turns north after flowing under Interstate 680 (I-680) and continues through artificially built earth channels until crossing Calaveras Boulevard. The proposed project would modify the section of creek channel between I-680 (the upstream boundary of the proposed project) and Calaveras Boulevard (the downstream boundary). Downstream of Calaveras Boulevard, the creek flows through about 2 miles of artificial earth and concrete-lined channels and then discharges to Lower Penitencia Creek. The District's Lower Berryessa and Lower Calera Creek Flood Protection Improvements Project, a separate project, is currently under construction. That project is planned for three years of construction (i.e. through 2017) and would increase the flow capacity of Lower Berryessa and Lower Calera Creeks, allowing them to convey the 100-year flood without overtopping of banks (SCVWD 2011).

Downstream of Calaveras Boulevard and outside of the ~~D~~EIR project area, Berryessa Creek is bordered by residential development on both sides. Much of this reach parallels the Union Pacific Railroad (UPRR). The creek crosses the Hetch Hetchy pipeline near Hillview Avenue downstream of Calaveras Boulevard. Planned modifications to Berryessa Creek and its tributaries downstream of Calaveras Boulevard were evaluated in the Lower Berryessa Creek Program Final EIR and are not part of the project evaluated in this ~~D~~EIR.

The project area (i.e., the four creek reaches where project activities would occur) is located within the central portion of the watershed described above and extends for approximately 2.2 miles along the creek. The project area is located primarily within the city limits of Milpitas, with a small stretch at the south end falling within the city limits of San Jose. Nearby major roads include Calaveras Boulevard (Highway 237), Milpitas Boulevard Interstate 880 (I-880), and I-680 (Figure 2.3). Surrounding land uses are primarily industrial and commercial, with two residential areas abutting the project area.

The project area has been divided into four reaches (from downstream to upstream) for overall description, analysis, and reporting purposes, as shown in Table 2.1. These reaches also correspond to the hydraulic reaches used in the hydraulic studies described below. The reaches are shown on Figure 2.3.

Table 2.1 Upper Berryessa Creek Project Area Reaches

Reach No.	Location	Length (feet)	Description
1	Calaveras Boulevard to Los Coches Street Bridge (Stream Miles 1.68 to 1.77)	500	The existing channel is a trapezoidal earth channel passing through an industrial/commercial area of Milpitas. This reach includes a vehicle/pedestrian bridge at Calaveras Blvd.
2	Los Coches Street Bridge to Piedmont Creek (Stream Miles 1.77 to 2.18)	2,150	The existing channel is a trapezoidal earth channel passing through industrial and residential areas of Milpitas. This reach includes a vehicle bridge and a separate pedestrian bridge at Los Coches Street. Los Coches Creek discharges into Berryessa Creek from the east upstream of Los Coches Street. Piedmont Creek discharges into Berryessa Creek from the east at the upper limit of the reach.
3	Piedmont Creek to Montague Expressway (Stream Miles 2.18 to 3.15)	5,150	The existing channel is a trapezoidal earth channel through an industrial area of Milpitas. This reach includes vehicle/pedestrian bridges at Yosemite Drive and Ames Avenue, a culvert serving the UPRR rail line, and a trestle serving the UPRR rail line downstream of Montague Expressway.
4	Montague Expressway to I-680 (Stream Miles 3.15 to 3.81)	3,450	The existing channel is a trapezoidal earth channel crossing the Milpitas-San Jose city boundary. Commercial and residential development is present along this reach. Concrete channel lining is present at two large creek bends. This reach includes a vehicle/pedestrian bridge at Montague Expressway and a pedestrian overpass downstream of I-680.

2.3. PROJECT BACKGROUND AND OBJECTIVES

The District is charged with providing flood protection within the overall Coyote Watershed, as well as four other watersheds within its jurisdiction. The Coyote Watershed includes numerous tributaries to Coyote Creek, of which Berryessa Creek is one of the largest. Along these and other streams, the District implements improvements to contain the base flood, also known as the 100-year flood. District standards also require an additional 3 feet of freeboard, except at bridges where 4 feet of freeboard is required 100 feet upstream and downstream of bridges. The proposed project would meet these District requirements.

Flooding within the Berryessa Creek watershed and vicinity has occurred often during the past decades. Stormwater flooding inundating streets and yards is estimated to occur on an average of at least once every 4 years. Floodwaters overtop the channel banks of Berryessa Creek an average of once every 10 to 20 years (USACE 2014), and cause significant damage to homes, businesses, infrastructure, and automobiles. The dollar value of flood damage from the 1 percent flood is estimated at $528 million in 2011 dollars.

High rainfall events occurring in 1982, 1983, and 1998 caused extensive flooding and damage to the east and central portions of San Jose and western Milpitas. High flows overtopped tributaries to Berryessa Creek and overtopped Upper Berryessa Creek approximately 1,000 feet upstream of Calaveras Boulevard. The 1983 floods, which affected parts of Upper Berryessa Creek, caused sufficient damage that the Governor of California issued a State of Emergency Declaration, and the President of the United States issued a Declaration of a Major Disaster for Public Assistance. Floodwaters occurring in the 1998 event breached a levee in a tributary downstream of the project area, causing failure of a stormwater pump station and flooding of up to 4 feet in the California Landing area of Milpitas (USACE 2014).

As a result of these and other floods, a team composed of staff from the District and the USACE commenced studies to identify areas of Berryessa Creek and its tributaries that are most vulnerable to flooding. One of the key products was a detailed hydraulic model of the Berryessa Creek system. Table 2.2 identifies the channel capacity that was modeled for each reach under existing conditions, as well as the size of the 1 percent recurrence flow.

Table 2.2 Channel Flows and Capacities

Reach	Description	1% Recurrence Flow (cfs)	Existing Channel Capacity (cfs)
4	I-680 to Montague Expressway	2,140	830 – 3,140
3	Montague Expressway to Piedmont Creek	2,780	1,350 – 3,500
2	Piedmont Creek to Los Coches Street	3,880	840 – 2,250
1	Los Coches Street to Calaveras Boulevard	4,990	1,600 – 2,550

Source: NHC 2006

The team mapped areas that would be flooded under the 100-year ~~flow.~~storm event. These areas are shown in Figure 2.4. The floodplain shown in Figure 2.4 is based on modeling performed during preparation of the USACE's GRR/EIS (USACE 2014) and is not necessarily consistent with the FEMA Special Flood Hazard Areas, shown in Figure 2.5, because of the availability of more recent hydrologic information and updated modeling. Based on the mapping of the FEMA Special Flood Hazard Areas shown in Figure 2.5, approximately 650 parcels would be removed from the flood hazard area. The following section describes the ability of each reach to contain flood flows (USACE 2014).

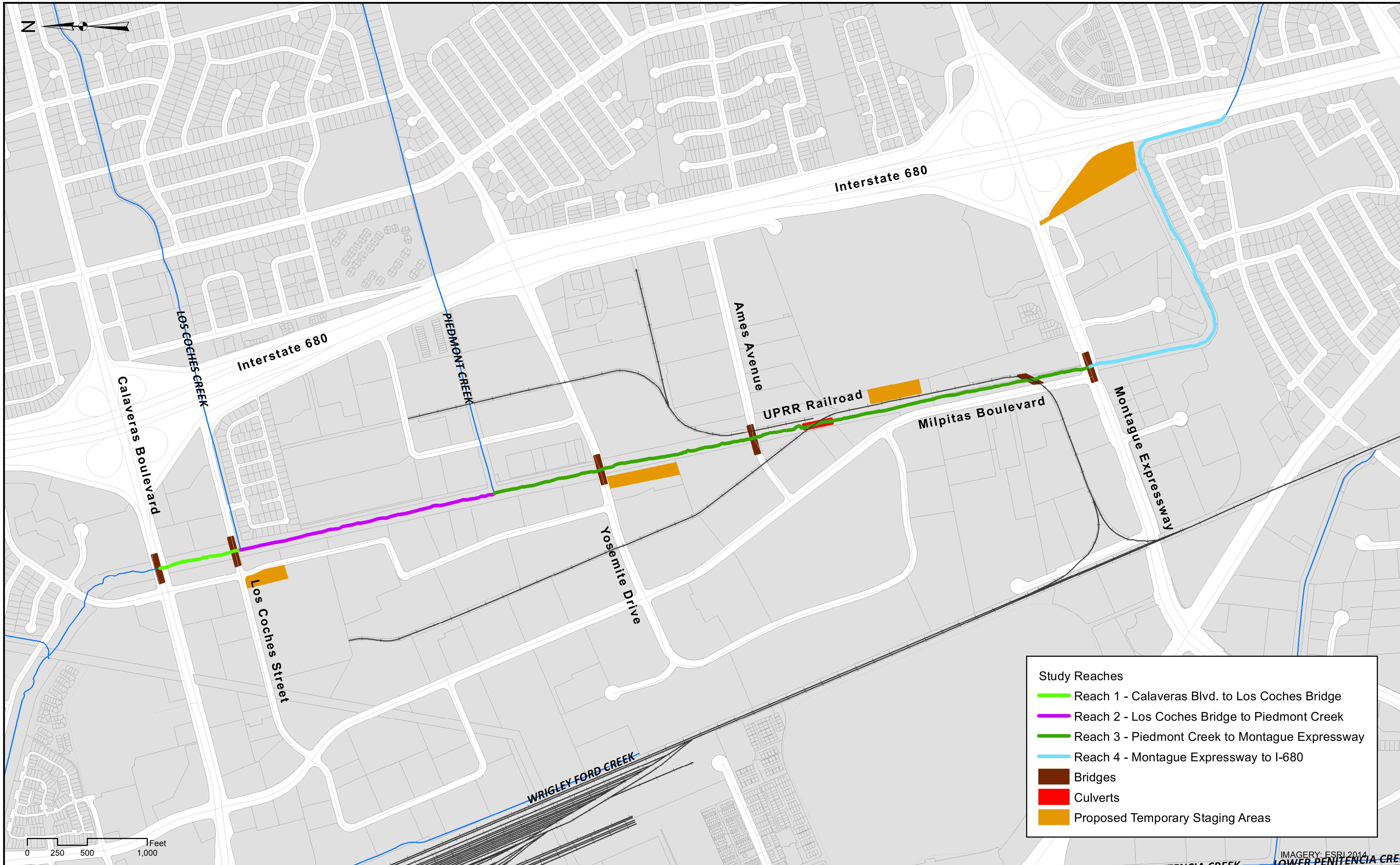

Figure 2.3 Project Reaches

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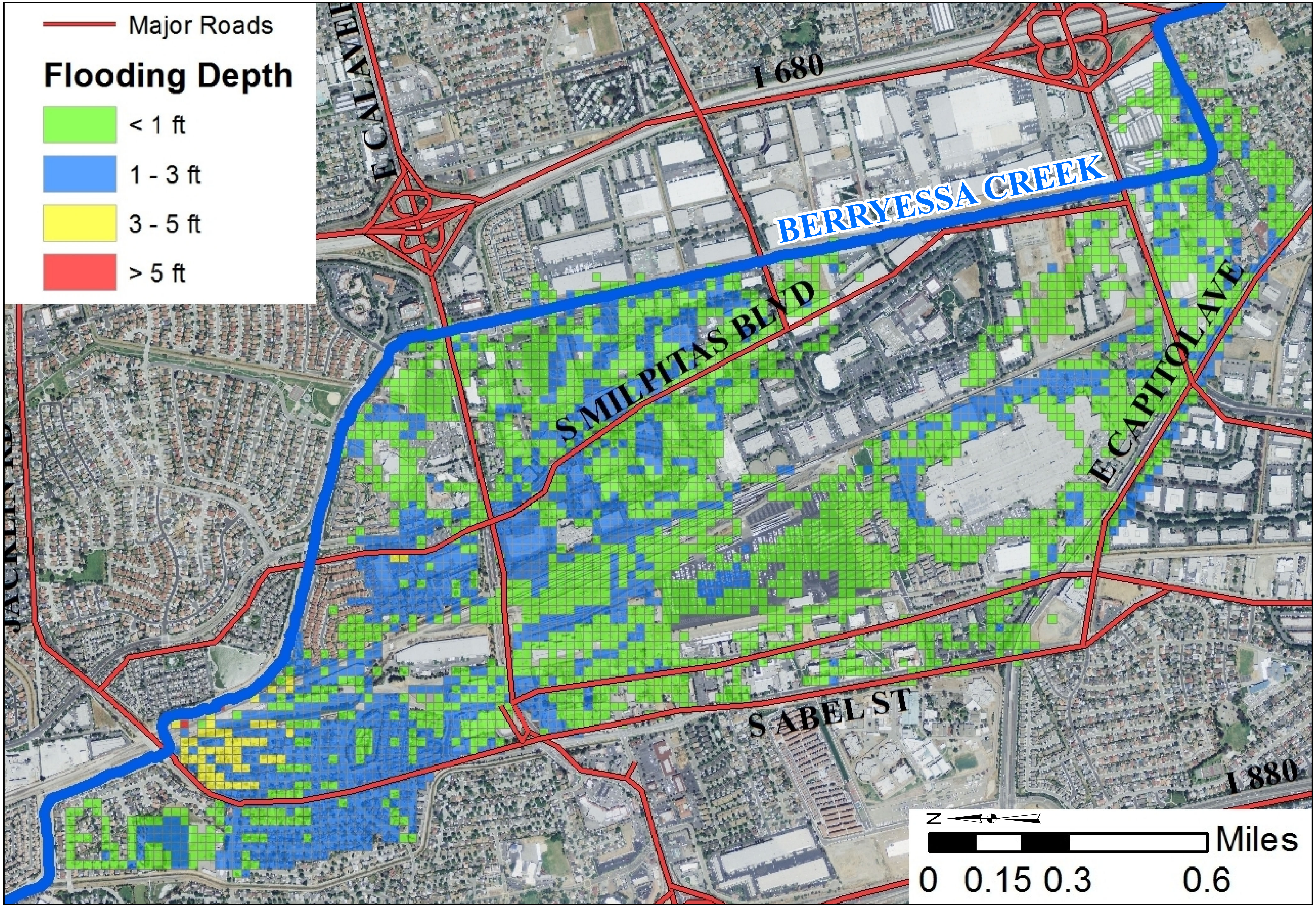

Figure 2.4 100-Year Flood Zone	Tetra Tech 17885 Von Karman Avenue, Suite 500 Irvine, CA 92614 Tel. (949) 809-5000 Fax. (949) 809-5003	Santa Clara Valley Water District	UPPER BERRYESSA CREEK FLOOD RISK MANAGEMENT PROJECT

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2.3.1. I-680 to Montague Expressway (Reach 4)

The channel in this reach is an earthen trapezoidal shape from I-680 to the Montague Expressway Bridge. In this reach, there are two greater than 90 degree bends, one downstream of I-680 and one upstream of Montague Expressway. The two bends are concrete-lined and bank erosion is present at the transitions. The channel through each bend has the capacity to carry only a 20- to 25-year event. Flows breaking out of the main channel will flow to the area of low elevation near Lower Penitencia Creek and continue north to its confluence with Berryessa Creek. These overflows would cause significant damage to commercial and industrial structures and contents. There is essentially no floodplain to allow flood attenuation in this reach.

2.3.2. Montague Expressway to Piedmont Creek (Reach 3)

This reach has an earthen, generally trapezoidal-shaped channel. However, much of the channel also has steeply sloped banks experiencing substantial erosion. The channel is estimated to have the capacity to carry the 25-year flow. During high flow events, overflow occurring upstream of Montague Expressway will limit the channel flows through this reach. Overflow from the channel in this reach is thus limited. The UPRR trestle crossing the channel is constructed of timber and is old and in poor condition. Overflows will occur due to backwater at the trestle about 400 feet downstream of Montague Expressway and at the Yosemite Drive Bridge. There is essentially no floodplain to allow flood attenuation in this reach.

2.3.3. Piedmont Creek to Los Coches Creek (Reach 2)

The channel in this reach is earthen and generally of trapezoidal shape with bank erosion occurring in various areas. The inflow from Piedmont Creek and a low 1,500-foot segment along the west bank will result in channel overflows during the 5-year event. The overflows will cause shallow flooding, but not significant damage to nearby commercial and industrial buildings and their contents. There is essentially no floodplain to allow flood attenuation in this reach.

2.3.4. Los Coches Creek to Calaveras Boulevard (Reach 1)

The existing channel is earthen and generally of trapezoidal shape with bank erosion occurring in various areas. The inflow from Los Coches Creek exacerbates the limited capacity of the existing channel. However, the overflows at the upstream reach below Piedmont Creek will somewhat reduce flows and the flood threat in this reach. Still, the Calaveras Boulevard Bridge could be overtopped from coincident high flows of Upper Berryessa and Los Coches Creeks. There is essentially no floodplain to allow flood attenuation in this reach.

2.3.5. Project Objectives

Hydraulics studies, and associated studies regarding economics, geotechnical issues, hazardous materials, and sediment movement, were prepared in support of the final Berryessa Creek Project GRR-EIS issued in 2014 (USACE 2014). In summary, the studies conducted for the GRR found that several of the reaches do not have sufficient capacity to contain the 100-year or 1 percent flood, meaning that destructive flooding will continue to occur unless flood risk management measures are taken. The studies also show that continued flooding will result in extensive economic impacts, with expected annual damages in Economic Impact Area E, which includes the project area, expected to be over $5 million (USACE 2014).

The District developed the following objectives for the proposed project:

- ***Objective 1:*** *Reduce flood damages from Berryessa Creek upstream of Calaveras Boulevard throughout the study reach during the 50-year period of analysis beginning in 2017. Completed project would meet FEMA certification standards in all 4 project reaches.*

- ***Objective 2:*** *Use environmentally sustainable design practices in addressing the flood risk management purpose of the project wherever possible within the study reach, including taking advantage of restoration opportunities that may be pursued incidentally to the flood damage reduction purpose.*

- ***Objective 3****: Be consistent with the Berryessa Creek Flood Risk Management Project Plan selected by USACE in the Director's Report of May 29, 2014.*

2.4. RELATIONSHIP TO OTHER DISTRICT ACTIVITIES

2.4.1. Lower Berryessa Creek Program

The nearest District capital project is just downstream of the project area (i.e. downstream of Calaveras Boulevard). Referred to as the Lower Berryessa Creek Program, it includes flood risk management elements for Calera, Tularcitos, and Lower Penitencia Creeks, as well as Lower Berryessa Creek (SCVWD 2011). The purpose of the Lower Berryessa Creek Program is to provide flood protection for a design flow of the 100-year flood event. Its implementation would ensure that the increased flow associated with the Upper Berryessa Creek project would also be contained with appropriate freeboard. Additional actions that are part of the Lower Berryessa Creek Program include improving access for long-term channel maintenance, enhancing riparian and stream habitat, and integrating levees with the City of Milpitas' Trail System. The Lower Berryessa Creek and Lower Calera Creek Flood Protection Improvements Project, part of the Lower Berryessa Creek Program, is currently under construction by the District. The Lower Berryessa Creek Program is a separate activity with independent utility from that of the proposed project. Implementation of the Lower Berryessa Creek Program is not dependent upon implementation of the proposed project.

2.4.2. Stream Maintenance Program 2

The Stream Maintenance Program 2 (SMP2) provides support for District implementation of routine stream and canal maintenance activities in a manner that allows the District to meet designed flood protection mandates in an environmentally sensitive manner (SCVWD 2012). The SMP2 specifies maintenance measures related to sediment removal, vegetation management, bank protection, trash removal, and fence and access repair. SMP2 activities are permitted by regulatory agencies and will continue to occur throughout the District (including Upper Berryessa Creek) in conformance with those permits.

2.5. DESCRIPTION OF THE PROPOSED PROJECT

The proposed project has been designed to provide flood damage reduction benefits along Upper Berryessa Creek from the overpass of I-680 in the City of San Jose to the upstream side of Calaveras Boulevard in the City of Milpitas. The proposed project would provide increased flood protection by constructing channel and other improvements designed to convey the 1 percent exceedance probability event (also referred to as the 100-year flood event) within the channel banks. The proposed project would remove ~~an estimated 500~~approximately 650 parcels of land from the flood hazard zone (Figure 2.5).~~ ~~ The proposed project would integrate with the Lower Berryessa Creek channel located

downstream of Calaveras Boulevard, which is currently being enlarged by the District to accommodate the 1 percent flow without overtopping of the creek banks. Construction of the Lower Berryessa Creek and Lower Calera Creek Flood Protection Improvements Project is scheduled for completion in 2017, which is the same year that the Upper Berryessa Creek project would be completed.

Proposed flood protection measures include a combination of features that are intended to modify the Berryessa Creek's hydrology to move flood flows through the stream channel more efficiently than under existing conditions, and installation of a floodwall to contain flows that break out and cause flooding under existing conditions. Table 2.3 summarizes hydrologic performance of the existing channel and performance of the channel that would occur under the current USACE-selected project (Alternative 2A in the USACE EIS and this EIR) and under the proposed project as documented in the Draft Hydraulic Technical Memorandum (Tetra Tech 2015a). The memorandum indicates that the project objectives of meeting FEMA certification standards and using environmentally sustainable design practices can be met by modifying Alternative 2A (the current USACE-selected project). The required modification consists of increasing the length and height of the floodwall on the west bank of the creek in Reaches 2 and 3. Compared to Alternative 2A, the proposed project would lengthen the floodwall from 1,300 feet to 2,200 feet and increase its height from 1.5 foot to 2 feet above ground level. Both the proposed project and Alternative 2A would include a completely buried concrete floodwall with a length of about 450 feet in Reach 4. These modifications would result in a conditional, non-exceedance probability of 95 percent that flood waters will not overtop the banks during the 1 percent flow event, which is required to meet FEMA certification standards. The Hydraulic Technical Memorandum also indicates that maximum stream velocities under both Alternative 2A and the proposed project would be reduced compared to existing conditions in all locations other than transitions located at bridges and culverts.

<table>
<tr><th colspan="4">Table 2.3 Upper Berryessa Creek Discharge and Stream Velocity</th></tr>
<tr><th rowspan="2">Location</th><th>Baseline
(2014 conditions)</th><th>Baseline
(2014 conditions)</th><th>ALT 2A/Proposed
Project</th></tr>
<tr><th>Q_{100}
(cfs)</th><th>Max Velocity
(ft/sec)</th><th>Max Velocity
(ft/sec)</th></tr>
<tr><td>Reach 1: Calaveras to Los Coches</td><td>3,875/4,095</td><td>11.3</td><td>5.87</td></tr>
<tr><td>Reach 2: Los Coches to Piedmont Creek</td><td>3,013</td><td>8.19</td><td>8.17</td></tr>
<tr><td>Reach 3: Piedmont Creek to Yosemite</td><td>2,170</td><td>9.02</td><td>12.63</td></tr>
<tr><td>Transition</td><td>2,010</td><td rowspan="2">13.3</td><td>17.52</td></tr>
<tr><td>Reach 3: Yosemite to Montague</td><td>2,010</td><td>10.25</td></tr>
<tr><td>Reach 4: Montague to Upstream Limit</td><td>2,010/1,545</td><td>9.21</td><td>9.73</td></tr>
<tr><td colspan="4">Source: Tetra Tech 2015a</td></tr>
</table>

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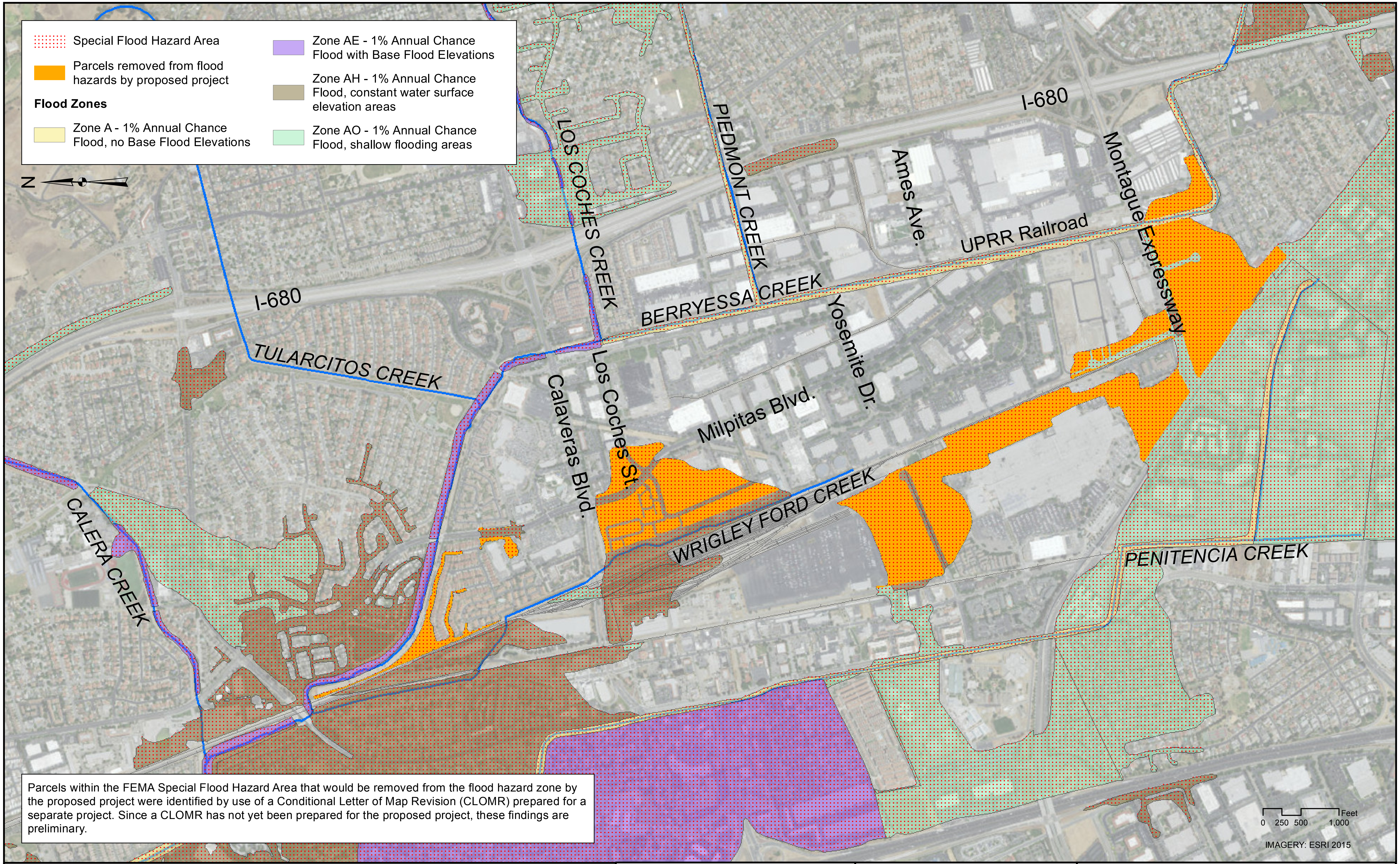

Figure 2.5 FEMA Special Flood Hazard Areas

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The major features of the proposed project include widening of the creek channel, construction of transition structures at bridges, expanding or surfacing with aggregate paving existing access roads, and adding concrete floodwalls in two areas where adequate channel width cannot be attained due to physical limitations of the project area. The maximum depth of creek bed excavation within the project area would be seven feet, of which five feet would be backfilled after placement of materials to stabilize the toe of the channel bank. The average depth of excavation would be between 18 and 24 inches. Specific features of the proposed project include the following:

- Channel excavation and shaping of earthen trapezoidal channels up to the water surface level of the 50 percent certainty and 1 percent exceedance probability event discharge, extending from I-680 to Calaveras Boulevard;
- Shaping of 2H:1V channel sideslopes along trapezoidal walls with buried rock revetment scour protection placed from the toe of bank to between the 2.5-year and 10-year flood elevation and installation of biodegradable erosion control blankets and vegetation between the top of the rock revetment and the top of the bank;
- A roughly 2,200-foot long concrete floodwall on the west bank of Upper Berryessa Creek with a maximum height of 2 feet above ground level. The floodwall would extend from roughly the Piedmont Creek confluence to about 1,500 feet upstream of Los Coches Street;
- A roughly 450-foot buried floodwall located on the west bank of the creek upstream of Montague Expressway
- Installation of concrete box culverts and wingwalls at Los Coches and Piedmont Creeks, with access roads constructed over the top of the culverts;
- New access road located along the east bank channel slope downstream of Yosemite Drive, and a concrete-paved ramp to access the channel bottom in Reach 4;
- Replacement of the existing UPRR trestle with a double-barreled box culvert;
- Construction of transition structures (concrete warped wingwalls between the channel banks and bridge abutments) at upstream and downstream faces of the newly constructed UPRR trestle, existing UPRR culvert, and existing Los Coches Street Bridge, and at the upstream face of existing Calaveras Boulevard Bridge;
- Shoring of existing bridge abutments and construction of transition structures at Ames Avenue and Yosemite Drive to accommodate widened channel; and
- Relocation of utilities and storm drains entering the channel or running parallel to the channel located within the channel excavation areas.

Temporary road closures during construction may occur as follows:

- One traffic lane and one parking lane closed on Yosemite Drive for up to 10 days. Traffic would continue to use two lanes in one direction but only one lane in the other direction. This would add delays to traffic on Yosemite Drive but would not require diversion to alternative routes.
- One traffic lane and one parking lane closed on Ames Road for up to 10 days. The traffic flow on Ames Avenue could be maintained in the single available lane during the period of lane closure.
- One traffic lane and one parking lane closed on Los Coches Street for up to 10 days. The traffic flow on Los Coches Street would be maintained in the single available lane during the period of lane closure.
- On-street parking lanes would be temporarily closed in the vicinity of all construction ingress and egress sites, including at Montague Expressway, Yosemite Drive, Ames Avenue, Los Coches Street and Calaveras Boulevard.

2.5.1. Detailed Project Features and Construction Schedule

Construction would occur over the course of 1 to 2 years, with construction occurring primarily during the dry season between May and October. Construction is expected to be completed by fall 2017. The

specific improvements described below are segmented between successive bridge crossings. Creek banks are referred to as right or left bank, determined from the perspective of looking downstream from the center of the channel. Right bank will be the east side of the channel, while left bank will be the west side, except in Reach 4, where the creek runs from east to west for a short distance.

PROPOSED PROJECT FEATURES AND PROPERTY ACQUISITION. General project features are shown in Figures 2.~~5~~ 6 and 2.~~6~~7. While the overall project configuration has been designed to fall within the existing public rights-of-way, the acquisition of several small parcel areas would be required to maintain continuous access along the channel. Additionally, temporary construction easements would be required from the City of Milpitas, UPRR, and the City of San Jose for permanent project access, staging areas and construction access routes. They are shown on Figure 3.14 and include:

- A small strip of land downstream of Montague Expressway (10 by 100 feet) (APN 086-32-021) (permanent easement, in fee);
- Staging area at undeveloped parcel along left bank upstream of Yosemite Drive (APN 086-30-048) (temporary construction easement);
- Staging area at corner of Los Coches Street and Hillview Drive (APN 086-28-049) (easement);
- Staging area downstream of Montague Expressway on east bank near intersection of Milpitas Boulevard and Gibraltar Drive (APN 086-30-028) (temporary construction easement);
- Staging area in a San Jose Water Company parcel southwest of the I-680/Montague Expressway interchange (APN 092-08-016) (temporary construction easement);
- Permanent access easement from San Jose Water Company on right bank of upstream bend in Reach 4 (permanent easement, in fee);
- Maintenance easements from the City of Milpitas below bridges at Montague Expressway, Ames Avenue, Yosemite Drive, Los Coches Street, and Calaveras Boulevard (permanent easements, in fee); and
- Easements from UPRR on both sides of the creek in the vicinity of the UPRR trestle (permanent easements, in fee).

STAGING AREAS. As noted above, four parcels adjacent to the construction right-of-way would serve as construction staging areas (Figures 2.6~~5~~ and 2.7~~6~~). The southernmost staging area is located in Reach 4, at the southwest corner of Montague Expressway and I-680. The site is undeveloped and portions appear to have served as a storage facility for construction materials in the past. The next downstream staging site is located on the east side of the creek between Ames Avenue and Montague Expressway, and would be accessed via Ames Avenue. The site is undeveloped and located between a warehouse structure and a railroad track. The next staging area is west of the creek and just south of Yosemite Drive, and would be accessed via Yosemite Drive. The northern portion of the site has been cleared and graded and used as overflow parking for an adjacent manufacturing and distribution business. The remainder of the site is undeveloped. The fourth site, located at the southwest corner of Los Coches Street and S. Hillview Drive, is undeveloped and would be accessed via Los Coches Street.

At each site, minor grading and vegetation removal would occur prior to its use for staging. Workers may access the sites using the streets identified above or by using the access roads located in the overbank areas. Haul trucks would use the same routes.

CHANNEL MODIFICATIONS. Channel widening is proposed in combination with floodwalls to meet the desired level of flood protection. The channel designs are depicted in the typical sections shown in Figure 2.8~~7~~. The extent of proposed armoring, including toe-down depths and armor rock gradation, may vary from section to section as the design is refined. Turf reinforcement mats (TRM) (a.k.a. erosion control blankets), which are biodegradable mats made from coconut fiber, would be placed from the top of rock revetments to the top of each bank and would be buried and hydroseeded to grow

vegetative cover. In narrow reaches, the toe protection would be continuous to maintain the integrity of the channel. Disturbed areas would be hydroseeded to promote vegetative growth and prevent soil erosion. Grass and forbs seeds would be hydroseeded on the banks and upland disturbed areas and native wetlands seeds would be hydroseeded in the disturbed bed of the creek.~~The channel profile may require grade control at bridge or utility crossing locations to prevent downcutting of the channel. Additional geomorphic and sediment transport analyses would determine whether there is a need for additional grade control.~~

2.5.1.1. *Channel Reach from I-680 to Montague Expressway (Reach 4)*

In the upstream portion of this reach, minor grading along the left bank would be performed to install the rock revetment and the TRM. Trees located along the southwest bank would be protected in place. Channel improvements at the downstream portion of this reach consist of excavating a 9- to 12-foot-deep, 16-foot-wide-bottom earthen channel with buried rock revetment and installation of TRM on 2H:1V side slopes. Along this segment, an 18-foot-wide aggregate-paved maintenance road would be provided due to the limited right-of-way along the south bank. A 12-foot-wide concrete access road would also be constructed from the right bank down into the channel. Additionally, the existing concrete channel lining (located at the westernmost 90-degree bend just upstream of Montague Expressway) would be removed and replaced with an earthen, graded trapezoidal channel. A 450-foot buried floodwall would be installed upstream of Montague Expressway for the purpose of reinforcing an existing retaining wall found in this area. The buried floodwall would be installed on the west bank of the creek, between 400 feet and 850 feet upstream of Montague Expressway.

2.5.1.2. *Channel Reach from Montague Expressway to UPRR Culvert (Reach 3)*

Downstream of Montague Expressway and extending to the UPRR trestle, channel improvements consist of excavating a 10.5-foot-deep, 12-foot-wide-bottom earthen channel with rock revetment and biodegradable TRMs on 2H:1V side slopes. Moving downstream of the UPRR trestle, channel improvements consist of excavating a 9- to 13-foot-deep, 12-foot-wide-bottom earthen channel with biodegradable turf reinforcement mats and rock revetment at 2H:1V side slopes. Two aggregate-paved maintenance roads, 18 feet wide and 15 feet wide, would be provided on the right and left banks, respectively, throughout this reach. Buried rock revetment would continue along the bottom of the channel.

UPRR TRESTLE. The existing UPRR trestle across Berryessa Creek about 500 feet downstream of Montague Expressway is a timber railroad crossing with four sets of piers. The trestle would be replaced with a double-barrel concrete box culvert, with each barrel measuring 10-feet wide by 9-feet high. A transition structure would allow for stabilization of the culvert within the trapezoidal channel and would consist of a concrete warped wingwall, which is a concrete retaining wall structure which assists in the transition from a box culvert, storm drain, or a bridge to an open graded channel or natural wash. The trestle would be replaced on an expedited schedule, which would require the closure of the rail line for up to 3 days.

UPRR CULVERT. The UPRR culvert is a triple 11-foot-by-11-foot box culvert that crosses Upper Berryessa Creek at an angle of almost 60 degrees. The structure has sufficient conveyance to meet the requirements of the proposed project, but would require the installation of a transition structure similar to that described above for the UPRR trestle.

2.5.1.3. *Channel Reach from UPRR Culvert to Ames Avenue (Reach 3)*

Channel improvements consist of excavating an 11-foot-deep, 12-foot-wide-bottom earthen channel with rock revetment and biodegradable TRMs on 2H:1V side slopes. Two 18-foot-wide aggregate-paved maintenance roads would be provided on the right and left banks. Buried rock revetment would continue along the bottom of the channel. Chain-link fencing would be installed along the access road on the east and west banks, except adjacent to Milpitas Boulevard where a black metal picket fence would be installed.

2.5.1.4. *Channel Reach from Ames Avenue to Yosemite Drive (Reach 3)*

Channel improvements consist of excavating a 9.5-foot-deep, 12-foot-wide-bottom earthen channel with rock revetment and biodegradable TRMs at 2H:1V side slopes. Two 18-foot-wide aggregate-paved maintenance roads would be provided on the right and left banks. Buried rock revetment would continue along the bottom of the channel. A 15-inch sewer line owned by City of Milpitas along the right bank would be protected in place during construction.

AMES AVENUE BRIDGE. The Ames Avenue Bridge is a two-lane bridge with a single continuous pier. The span is approximately 80 feet; however, vegetation and sediment blocks much of the cross section below the bridge deck. The existing bridge would be retained, although the concrete channel lining beneath it would be replaced. Transition from bridge to channel would be graded, but would not include a concrete transition structure.

2.5.1.5. *Channel Reach from Yosemite Drive to Los Coches Street (Reaches 2 and 3)*

From Yosemite Drive Bridge to the Piedmont Creek confluence, the channel improvements consist of excavating an 11- to 13.5-foot-deep, 20-foot-wide-bottom earthen channel with rock revetment and biodegradable turf reinforcement mats at 2H:1V side slopes. Two 18-foot-wide aggregate-paved maintenance roads would be provided on the right and left banks. Since the bottom width would be 20 feet wide, the buried rock revetment toe protection would continue along the bottom of the channel. Within this section, two existing groundwater extraction vaults along the right bank, an existing Pacific Gas & Electric (PG&E) electrical vault, and a 15-inch sewer line owned by City of Milpitas along the right bank would be protected in place during construction. No utility relocations would be required through this reach.

From the Piedmont Creek confluence to the Los Coches Street vehicle and pedestrian bridges, the channel improvements consist of excavating a 9- to 14-foot-deep, 40-foot-wide-bottom earthen channel with biodegradable TRMs and rock revetment at 2H:1V side slopes. An 18-foot-wide and 15-foot-wide aggregate-paved maintenance road would be provided on the right and left banks, respectively. A 2-foot-high floodwall would be provided along the west bank for 2,200 linear feet starting at roughly the Piedmont Creek confluence, and ending at approximately 1,500 linear feet upstream of Los Coches Street to maintain a minimum channel depth of 11.5 feet.

YOSEMITE DRIVE BRIDGE. Yosemite Drive crosses a two-lane road over Berryessa Creek. Along the upstream face of the bridge, a water pipeline is supported by cantilevers. The proposed channel modifications in this reach include an access road on the overbank. The trapezoidal cross section with 2H:1V side slopes would continue on either side of the bridge. Transition from bridge to channel would be graded, but would not include a concrete transition structure.

PIEDMONT CREEK. The angle of confluence of Piedmont and Berryessa Creeks would be modified from the existing 90-degree confluence to 30 degrees to improve the channel hydraulics. Construction of a 6-foot-high by 14-foot-wide reinforced concrete box culvert approximately 40 feet upstream of the

confluence with Upper Berryessa Creek would allow the proposed access road on the east bank to continue across Piedmont Creek downstream of the railroad tracks. Both the railroad tracks and the access road would use the culvert to cross Piedmont Creek.

LOS COCHES CREEK. Los Coches Creek enters Upper Berryessa Creek from the east bank in this reach. This creek would be modified by installing a 7-foot-high by 14-foot-wide box culvert in the channel just upstream of its confluence with Upper Berryessa Creek, which would allow the construction of an access road over the tributary. The culvert would be wide enough to allow for extension of the east bank access road to Los Coches Street. The east bank access road currently ends 600 feet south of Los Coches Street.

POCKET PARK. The exercise equipment on the east bank just upstream of Los Coches Street and associated recreational trail would be removed to allow construction of the Los Coches Creek culvert and access road.

2.5.1.6. *Channel Reach from Los Coches Street to Calaveras Boulevard (Reach 1)*

Channel improvements consist of excavating a 12- to 14-foot-deep, 40-foot-wide-bottom earthen channel with rock revetment and biodegradable turf reinforcement mats at 2H:1V side slopes. An 18-foot-wide and 15-foot-wide aggregate-paved maintenance road would be provided on the east and west banks, respectively. A sampling/gauging station would be removed and replaced to allow for construction of the channel improvements. No utility relocations would be required through this reach.

LOS COCHES STREET BRIDGE. The Los Coches Street Bridge carries two lanes of traffic over a trapezoidal cross section with a single continuous pier at the center. The left side of the channel is concrete, and the right side of the channel is earthen with sacked concrete bank protection. On both the upstream and downstream faces of the bridge, a concrete warped wingwall transition structure would be constructed to provide integration into the trapezoidal channels.

CALAVERAS BOULEVARD BRIDGE. The Calaveras Boulevard Bridge serves an eight-lane divided roadway. The crossing is composed of a four-barreled culvert with 8-by-11-foot barrels. The outer two barrels are partially filled with the earthen sideslope that projects to the outside toe of the middle culvert barrels. Debris has accumulated to about 1 to 2 feet high within the inner two barrels. The bridge provides sufficient conveyance to accommodate flows under the proposed project, provided the sediment in the outer barrels is removed and the channel walls are tied into the existing structure. A concrete transition structure would be installed on the upstream side of bridge to assist in the conveyance of storm flows.

2.5.2. **Construction Methodology**

The main construction components are listed below. The components are listed roughly in the sequence in which they would occur, although several of them may occur concurrently. These construction activities would occur in all four reaches with some variation in intensity from reach to reach, except where noted in the descriptions below.

UTILITY RELOCATIONS. Various utilities run through the project area. Most utilities would be relocated prior to the primary construction items being performed. Clearing and grubbing would occur before the utility relocations take place. The types of utilities that may be relocated include underground electric cables, piping, outlet structures, and overhead lines. The new utility materials would be buried deeper than current conditions to avoid the channel improvement work. The storm drain outlet structures would be demolished and replaced during construction. The relocations would occur within the right-of-

way limits shown on the design plans and would involve underground relocations of utility lines (i.e., no aboveground utilities would be relocated).

CLEARING AND GRUBBING. The entire channel area would require clearing and grubbing prior to construction, which includes the removal of vegetation, debris, and soils to allow for a clear construction site. Clearing and grubbing would be performed with a crew using chainsaws and a bulldozer. This material would be hauled away and disposed of or chipped and reused on site for mulch.

DEWATERING (REACHES 1-3). Temporary methods to dewater the creek channel during construction may include use of cofferdams, sumps, or groundwater extraction wells. In Piedmont Creek and reaches of Upper Berryessa Creek downstream of Yosemite Drive, earthen cofferdams would be constructed at the upstream and downstream sections of the reaches under construction. The dams would consist of on-site excavated material, and would be covered with a waterproof liner. Dewatering pumps and a diversion pipe would be placed within the creek or in top of bank areas to dewater the channel and maintain dry conditions for the duration of construction. Surface water would be piped downstream and discharged back into the stream channel below the construction zone. Once the construction for the dewatered channel is complete, the cofferdams would be removed and replaced at the next construction location.

Groundwater may be encountered during excavation of the stream channel in all reaches. Groundwater that collects in the work area would be ~~tested for contaminants and, assuming it is free of contaminants,~~ discharged in a similar manner as surface water. Contaminated groundwater would either be treated to standards required by the San Francisco Bay Regional Water Quality Control Board and discharged downstream, or would be handled according to methods described in Section 3.9.6.

Pumping, treatment, and discharge of contaminated groundwater would require temporary use of portable generators. Up to 3 generators would be operated 24 hours/day for up to three weeks in the vicinity of the UPRR trestle (Reach 3) to power pumps and filtering equipment.

EXCAVATE AND HAUL. The construction of the channel would require material to be excavated, stockpiled, and hauled off-site for disposal. A loader would load the trucks with any materials that cannot be reused on-site. The trucks are assumed to travel 5 miles to an approved upland dump site, composting facility, or recycling facility.

PLACE AND COMPACT FILL. This item includes filling and compacting on-site excavated material. The backfill would be performed with a front-end loader. The compaction would be performed with a vibratory roller along with a water truck to prevent dust.

GEOTEXTILE FABRIC. Geotextile fabric would be installed in various reaches throughout the project to provide a barrier between existing ground and newly placed materials, such as rock revetment or biodegradable turf reinforcement mats. The fabric would be placed using a crane and crew.

FENCES AND GATES. In Reaches 1 through 3, chain-link fencing would be installed on both banks along the majority of the ROW for security and safety purposes. Gates or bollards would be installed on the west bank at the intersections of the access roads with Calaveras Boulevard, Los Coches Street and Yosemite Drive to restrict vehicle entry, but would be designed to allow access for pedestrians and bicyclists. Locked gates preventing public access would be installed on the east bank at the connections of the access road with Calaveras Boulevard, Los Coches Street, Ames Avenue, Yosemite Drive, and Montague Expressway and on the west bank at the connections with Yosemite Drive and Montague

Expressway. In Reach 4, locked gates preventing public access would be installed at the connections of the access road with Montague Expressway on the east and west banks of the channel.

IMPORT AND PLACE ROCK REVETMENT. Throughout the 11,500-foot length of the project area, the channel banks would require slope protection in the form of a rock revetment at the toe of the bank. The rock would be trucked into the project area from a local quarry. The nearest quarry that has been identified as having appropriate rock is located approximately 60 miles from the project area, but the project sponsors would attempt to identify a closer quarry. The rock would then be placed with a hydraulic excavator.

TURF REINFORCEMENT MATS. Biodegradable turf reinforcement mats would be installed above the 10-year flow elevation in newly graded channels to prevent bank erosion. The mats consist of 100% mattress-~~–~~grade coconut fiber mechanically bound and covered on both sides by netting. These mats biodegrade after 3+ years, and protect against erosion in the short term until vegetation becomes established. The mats would be placed using a crane, and would be hydroseeded to establish vegetative cover. The Design Documentation Report (Tetra Tech 2015f) analyzed this bank protection method and determined it would be sufficient to minimize bank erosion.~~.~~

CONCRETE. A 2,200-linear-foot concrete floodwall with a maximum height of 2 feet above the ground surface would be constructed on the west bank of Upper Berryessa Creek in Reach 2. Concrete would also be used as part of the transition structures installed upstream of the bridges at Calaveras Boulevard, Los Coches Creek, and Ames Avenue; to form the culvert which would replace the UPRR trestles on Upper Berryessa Creek and Piedmont Creek; and as part of a 450-foot buried floodwall support on the west bank upstream of Montague Expressway.

DEMO, HAUL, AND DISPOSE RAILS AND TIMBER (REACHES 2 AND 3). The railroad line on top of the existing wood trestles crossing Piedmont and Upper Berryessa Creeks and the timber in the trestle would be removed. The rails, ballast, timber and ties would be demolished, and then hauled off-site for disposal. Approximately 75 cubic yards of waste material would be removed from these locations.

CONSTRUCT REPLACEMENT CULVERTS (REACHES 2 AND 3). The railroad trestle crossing Upper Berryessa Creek in Reach 3 located about 400 feet north of Montague Expressway would be demolished and removed. The trestle would be replaced by a newly constructed railroad bridge. After the removal of the UPRR railroad trestle, a pre-cast, double-barrel box culvert would be installed. Each barrel would measure 10 feet wide by 9 feet high (10 x 9 feet).

The railroad trestle crossing Piedmont Creek would be removed and replaced with a pre-cast, single-barreled concrete culvert measuring 14 x 6 feet. A similar 14 x 6 ft. concrete culvert with concrete wingwalls would be installed at the mouth of Los Coches Creek.

RECONSTRUCT RAILS AND TIES (REACHES 2 AND 3). Replacement tracks would be built on top of new box culverts at Piedmont and Upper Berryessa Creeks. The bridge would include one new track connecting to the existing on either side of the bridge. Construction of the new track would require placement of new ballast rock on the culvert, and installation of new ties and rails.

SHEET PILING (REACHES 2 AND 3). At the bridges at Ames Avenue and Los Coches Street, sheet piling may be installed to protect some of the structures during construction, and would be removed after construction was complete.

ROADWAY BASE. A 3-inch-thick aggregate base layer would be placed on access roads in several reaches. The aggregate base material would be trucked to the project area and then placed by a front-end loader and grader.

2.5.3. Import and Disposal

An estimated 90,000 cubic yards of soil, reinforcing steel, vegetation, and concrete would be excavated during construction. About 3 percent of clean excavated soils would be reused on-site, eliminating the need for removal from the project area. Vegetation would be composted, steel and concrete debris would be recycled, and the balance of the materials would be disposed of at one or more approved landfills, which are identified in Section 3.16.2. Assuming 16-yard trucks are used, an estimated 2,459 truckloads of construction materials would be imported to the project area, and an estimated 5,625 truckloads of materials would be exported. Estimated quantities of materials that would be imported or exported are shown in Table 2.4. Although the construction contractor would be responsible for procurement of materials, it is expected that most construction materials would be locally sourced because most construction materials are available in the Bay Area and transporting materials from distant sources would be uneconomical.

Truck access to and from the project area and staging areas would be via designated truck routes and arterials. In general, trucks would access the creek corridor via Montague Expressway and Calaveras Boulevard from either I-680, I-880, or other truck routes. From these streets, trucks would access local arterials, such as S. Milpitas Boulevard, and then local streets, such as Los Coches Street, Ames Avenue, and Yosemite Drive, to access specific reaches.

Table 2.4 Quantities of Materials Exported and Imported to Construct the Proposed Project*				
Material	**Reaches 1-3**		**Reach 4**	
	Quantity	**Notes**	**Quantity**	**Notes**
Imported				
Cast in place concrete (cubic yards)	800	Includes all channel transition structures, floodwall, and RR culvert	220	Includes channel transition structure
Reinforcing steel (tons)	80		22	
Compacted fill (cubic yards)	520	Latest earthwork grading from AutoCAD dated 11/2014	2,100	Latest earthwork grading from AutoCAD dated 11/2014
Turf reinforcement mats (square yards)	43,620	Bank to bank and assume 10 percent overlapping	18,222	10-year flood elevation to top of bank and assume 10 percent overlapping.
Geotextile (square yards)	36,882	Geotextile underneath buried rock revetment, and toe down protection	18,222	Geotextile underneath buried rock revetment, and toe down protection
Rock revetment (tons)	57,600	Includes rock revetment at the toe down protection and at channel transitions	8,610	Includes the rock revetment at the toe down protection and at channel transitions
Hydroseeding (acres)	19		10	
Aggregate base access road (square yards)	27,800		7,270	
Exported				
Materials	**Reaches 1-3**		**Reach 4**	
	Quantity	**Notes**	**Quantity**	**Notes**
Demo and reconstruction of pavement, curb & gutter (square yards)	23	Materials would be reused on-site, or recycled to the degree possible	0	Materials would be reused on-site, or recycled to the degree possible
Demolish UPRR trestles (cubic yards)	75	All trestle materials would be exported to a landfill	0	
Excavate and haul to landfill (cubic yards)	74,500	Vegetation would be composted.	15,500	Vegetation would be composted.

*Estimates taken from Tetra Tech, 2013

2.5.4. Construction Equipment and Workers

The following types of equipment would likely be used for construction of the proposed project:

- Backhoes
- Bulldozers
- Crane
- Compactors
- Concrete Trucks
- Dump Trucks
- Excavators
- Jackhammers
- Graders
- Loaders
- Pumps
- Scrapers
- Portable generators

Construction would either occur over one to two years, primarily during the dry season from May to October. Construction hours would generally be during normal business hours, but after-hours work may be needed for concrete pours or replacement of the existing UPRR trestle with a concrete box culvert. The types of construction equipment in use and the number of workers actively working at the project area would vary depending on the phase of construction. The number of workers present on any given day is estimated at 25 in general, and up to 40 on occasion.

2.5.5. Maintenance

The District's SMP2 is an ongoing program that has permits from federal and state regulatory agencies. In conformance with those permits, District maintenance staff regularly perform a number of existing maintenance activities in the project reaches. District staff would continue to remove sediment and debris as needed to ensure proper flow, mow or spray vegetation to allow access and to reduce fire danger, inspect access roads for erosion or blockages, remove trash and graffiti for aesthetic and water quality purposes, and conduct vector and wildlife management to reduce hazards and potential damage to structures. These ongoing permitted activities are part of the environmental baseline, would not be modified by the proposed project (except as described in the next paragraph), and thus are and not part of the proposed project.

The proposed project would result in a channel slope that is very similar to the existing conditions (longitudinal grade between 0.2% and 0.5%), but with a widened channel with capacity to handle the 1 percent flood flows. The proposed channel design includes armoring of the bed and bank toe to prevent erosion, and according to the project sediment analyses (Tetra Tech 2015g), the proposed project area will act as a threshold channel section passing input sediment through with minimal deposition. The existing project reach is mainly filled with fine sediment from local rill and gully erosion, which appears to be the primary source of sediment in the project area. Most coarse sediment deposits in the upstream reaches (especially at the upstream Piedmont Road debris basin), or is removed from the upstream channel during periodic channel maintenance. With the proposed project, the banks will be stabilized and local sediment input will be reduced. According to the sediment transport model prepared by the District for this project (Tetra Tech 2015g), sediment deposition would only occur at two locations, at the UPRR trestle and UPRR culvert locations. The total depositional volume for the entire reach downstream of I-680 would be less than under the existing creek conditions. The District will continue to follow its Stream Maintenance Program Manual including implementing applicable BMPs.

After construction of the proposed project, the amount of sediment deposition and bank erosion in the project area would be expected to decrease, thereby reducing the amount of sediment removal and bank stabilization activities compared to existing levels. The level of animal conflicts would not change due to the project. Vegetation management would activities would also be unchanged because vegetation in the channel would not substantially change from existing conditions. As part of the project, a number of native trees and shrubs would be planted at top of bank areas. Because these trees and shrubs would be located outside the channel, they would require minimal maintenance consisting of pruning as necessary to prevent obstruction of adjacent roads or paths and maintain tree health.

In addition to the existing maintenance activities conducted by SMP2, the District would inspect and maintain floodwalls and other newly constructed project structures (i.e. floodwalls in Reach 2/3 and Reach 4, new concrete box culverts at the confluences of Berryessa Creek with Los Coches and Piedmont creeks, and the concrete box culvert replacing the existing UPRR trestle).~~.~~ In accordance with USACE standards for flood control structures including floodwalls, woody vegetation would be removed from within 15 feet of the floodwall. Other vegetation would be removed within 5 feet of the floodwall. The

floodwall would be visually inspected on a monthly basis and graffiti removed if necessary. Additional measures may be needed to maintain the floodwalls, their supports, and foundations, and would be detailed in maintenance guidelines for the floodwalls, UPRR culvert, and other structures that are constructed as part of the project. The incremental increase in maintenance activities over those currently occurring as part of SMP2 would result directly from implementation of the project and are analyzed in this ~~D~~FEIR to determine resulting environmental effects.

2.5.6. Required Permits and Approval, Agencies Using EIR

The following permits or approvals are required for implementation of the project:

- **U.S. Army Corps of Engineers 404(b) (1) analysis**: USACE has completed a 404(b) (1) analysis, which assessed the potential impacts to waters of the U.S. occurring under each of the project alternatives, examined if there are other methods to meeting the goals and objectives of the project while reducing impacts to waters of the U.S., and assessed other potential project impacts. The 404(b)(1) analysis concluded that the selected plan (i.e. Alternative 2A) is the Least Environmentally Damaging Practicable Alternative (LEDPA) and it is not possible to avoid placing fill material into waters of the U.S.; the alternatives would have minor, short-term impacts to soils and substrate quality; the alternatives would not alter stream hydrology, water chemistry, or other components of water quality other than short-term turbidity; would have no effects on the aquatic food web, special aquatic sites, threatened or endangered species or other wildlife; and would not violate federal or state water quality standards.
- **California State Water Resources Control Board** (**Construction General Permit):** Construction stormwater discharges would be authorized by the SWRCB General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit) in order to avoid and minimize water quality impacts attributable to such activities. The Construction General Permit applies to all projects where construction activity disturbs one or more acres of soil. Construction activities subject to this permit includes clearing, grading, and disturbances to the ground, such as stockpiling or excavation. The Construction General Permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP), which includes and specifies BMPs designed to prevent pollutants from contacting stormwater and keep all products of erosion from moving off-site into receiving waters. Routine inspection of all BMPs is required under the provisions of the Construction General Permit. In addition, the SWPPP must contain a visual monitoring program, a chemical monitoring program for non-visible pollutants, and a sediment monitoring plan if the site discharges directly to a water body listed on the 303(d) list for sediment.
- **San Francisco Bay Regional Water Quality Control Board Section 401 Water Quality Certification:** USACE regulations generally require USACE to seek Section 401 water quality certification for USACE projects involving a discharge into waters of the U.S. even though USACE does not issue itself a Section 404 permit. However, the project, as a project authorized by Congress that has completed an EIS, qualifies for exemption under 33 U.S. Code 1344(r). USACE will either obtain a Section 401 water quality certification or claim exemption under 33 U.S. Code 1344(r) for the proposed project.
- **California Department of Transportation** (**Encroachment Permit**): Work that encroaches onto a State ROW requires an encroachment permit that is issued by Caltrans. To support the process of applying for an encroachment permit, traffic-related mitigation measures would be incorporated into the construction plans and a Traffic Management Plan would be developed, as described in Section 3.15.6.
- **California Public Utilities Commission (CPUC)**: Any modifications of existing crossings, either at-grade or grade separated, require authorization from CPUC. A General Order 88-B may be required for modifications of existing crossings.

- **City of Milpitas Encroachment Permit**: Project improvements to the transition structures at the Los Coches Street, Yosemite Drive, and Ames Avenue crossings would require work within the City-owned property at these locations. The District plans to obtain required encroachment permits from the City of Milpitas to allow this work.

In addition, if necessary maintenance activities are not covered by SMP permits, the District would obtain approval and permits for the uncovered activities from The San Francisco Bay Regional Water Quality Control Board, California Department of Fish and Wildlife, and USACE Regulatory Branch as required by law.

The following agencies may use the EIR in their decision-making process to issue permits or approvals for the proposed project:

- California State Water Resources Control Board
- SFB RWQCB
- California Department of Transportation
- California Department of Fish and Wildlife
- CPUC
- City of Milpitas

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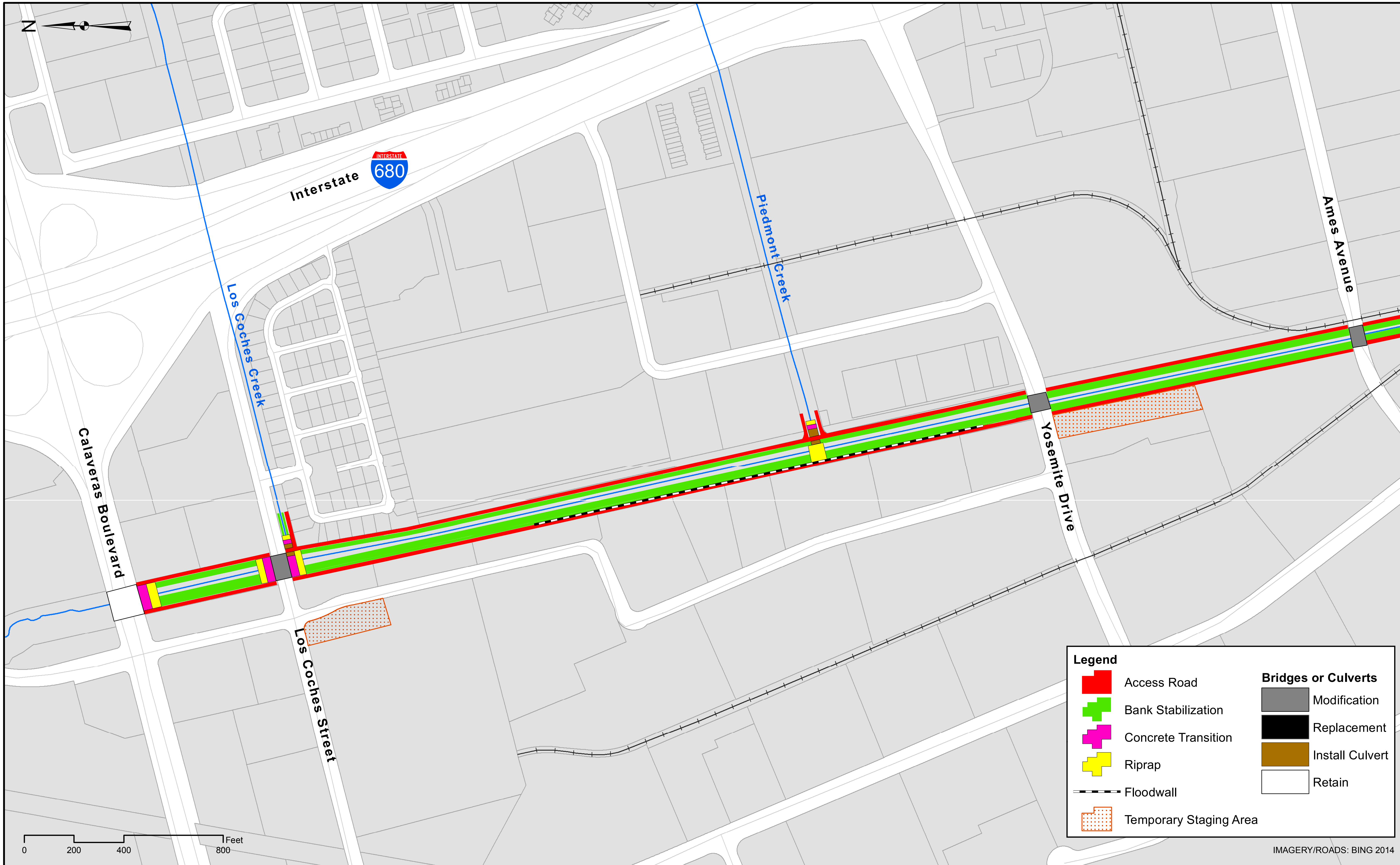

Figure 2.6 Proposed Project Overview
Ames Avenue to Calaveras Bouldevard

Tetra Tech
17885 Von Karman Avenue, Suite 500
Irvine, CA 92614
Tel. (949) 809-5000 Fax. (949) 809-5003

Santa Clara Valley Water District

UPPER BERRYESSA CREEK
FLOOD RISK MANAGEMENT PROJECT

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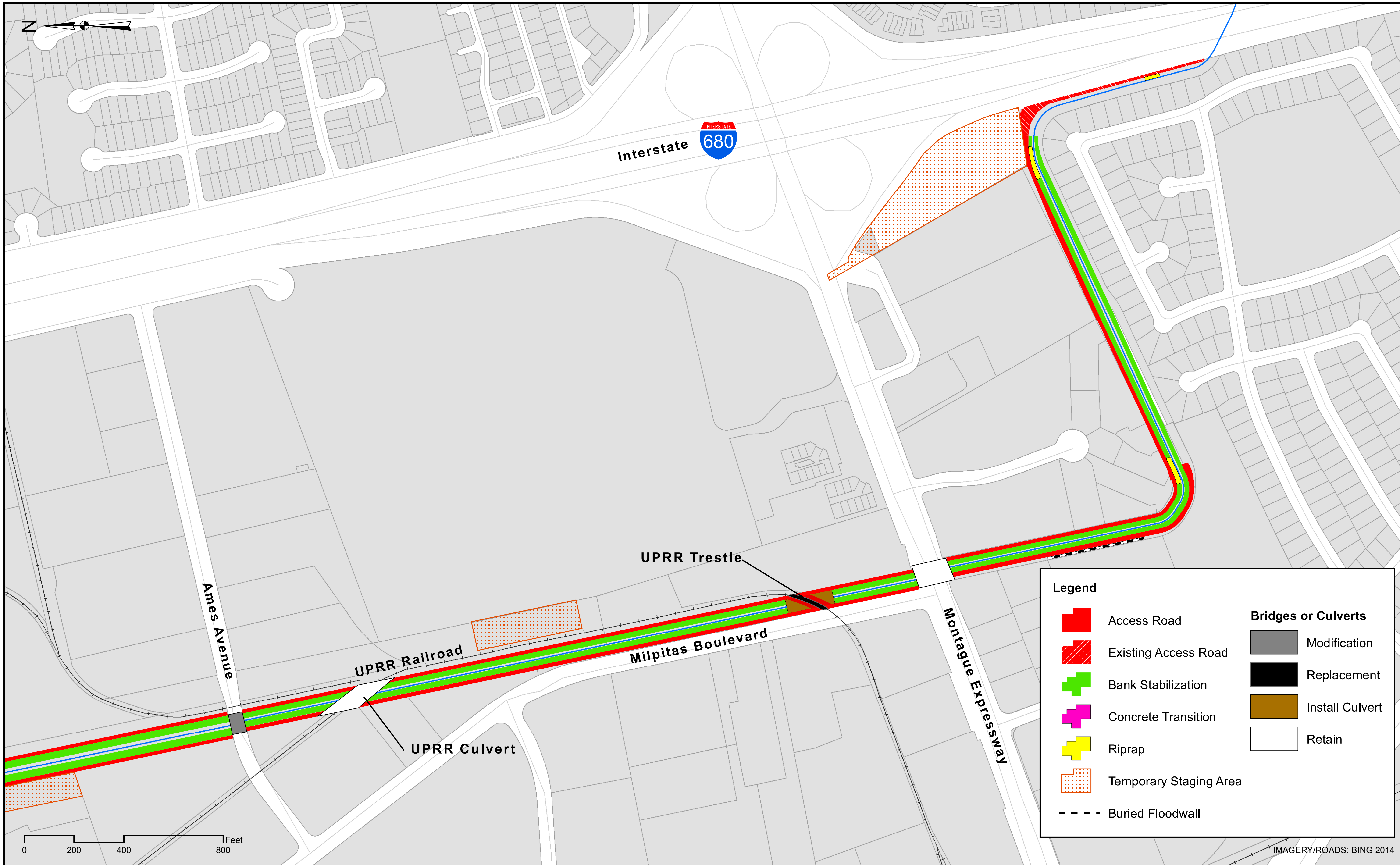

Figure 2.7 Proposed Project Overview
Interstate 680 to Ames Avenue

Tetra Tech
17885 Von Karman Avenue, Suite 500
Irvine, CA 92614
Tel. (949) 809-5000 Fax. (949) 809-5003

Santa Clara Valley Water District

UPPER BERRYESSA CREEK
FLOOD RISK MANAGEMENT PROJECT

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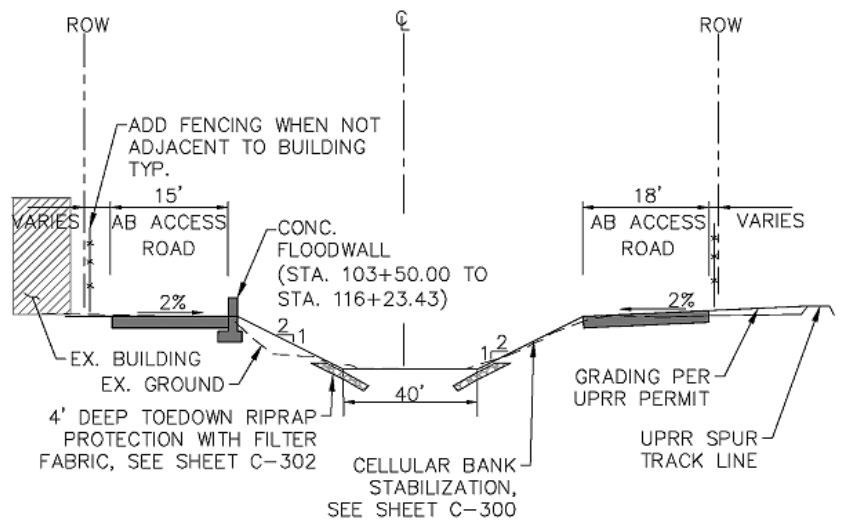
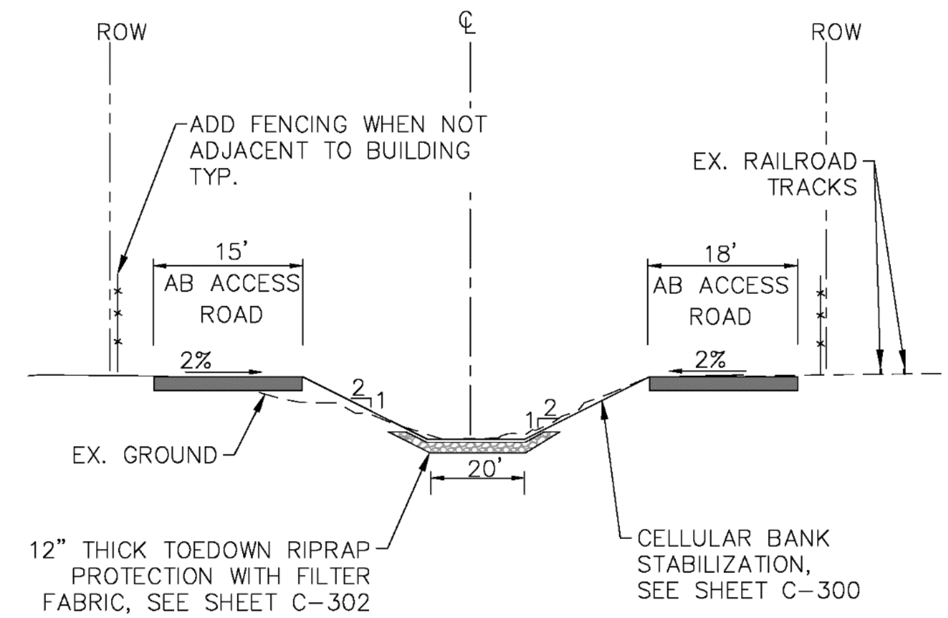
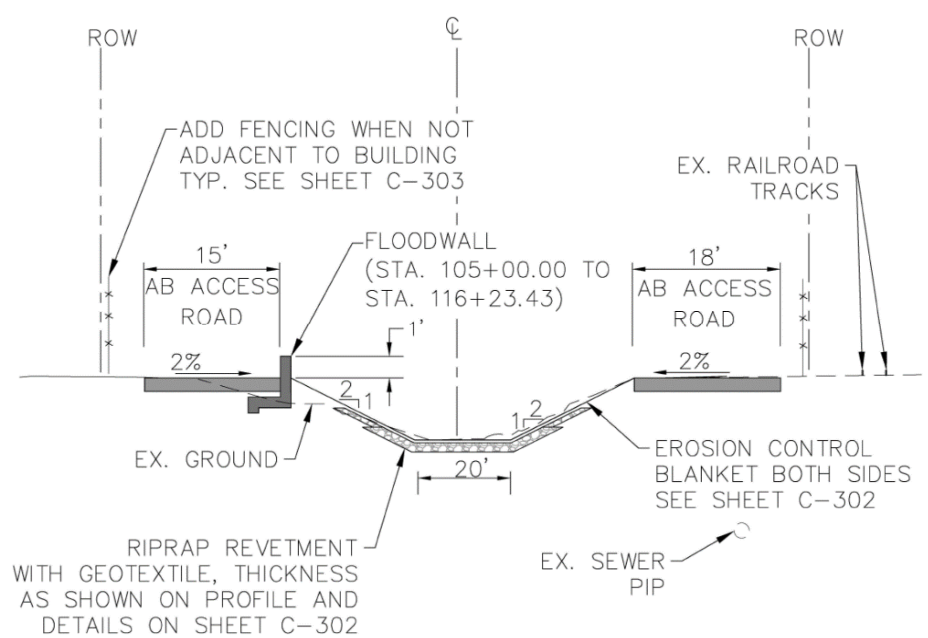


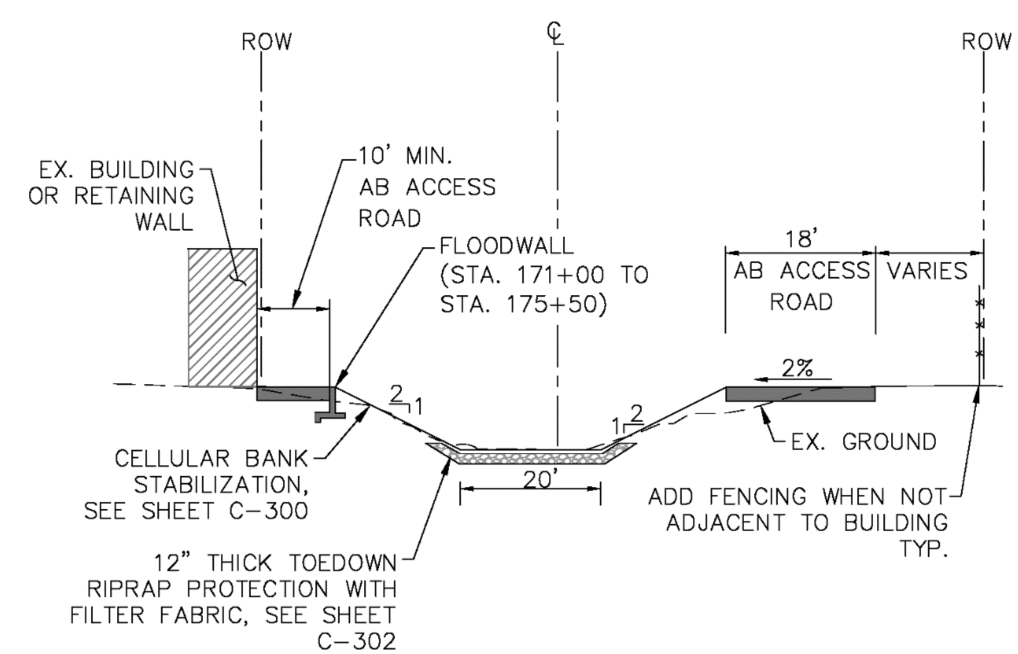
Typical section between Calaveras Boulevard and Piedmont Creek



Typical section between Yosemite Drive and Montague Expressway



Typical section between Piedmont Creek and Yosemite Drive



Typical section south of Montague Expressway

Figure 2.8 Proposed Project Typical Sections

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3. ENVIRONMENTAL SETTING, IMPACTS, AND MITIGATION MEASURES

3.1. OVERVIEW

This chapter describes resources that are found in the study area and describes the effects that implementation of the proposed project (described in Section 2.5) may have on those resources. Impacts to resources may typically result from the construction of the proposed project, or the operation and maintenance of the project. For each resource area, the potential impacts resulting from implementation of the proposed project are evaluated for their level of significance.
The categories used to designate impact significance are described below:

- *No Impact (NI)*. A project is considered to have no impact if there is no potential for impacts, or if the environmental resource does not exist within the project area or the area of potential effect. For example, there would be no impacts related to wastewater disposal if the project would not involve the production of wastewater.
- *Less than Significant (LS)*. This determination applies if there is some impact, but not one that qualifies under the significance criteria as a significant impact.
- *Less than Significant with Mitigation (LM)*. This determination applies to impacts that exceed significance criteria, but for which feasible mitigation is available to reduce the impacts to a less than significant level.
- *Significant Unavoidable (S)*. This determination applies to impacts that are significant but for which: (1) no feasible mitigation has been identified to reduce the impact to a less than significant level, or (2) feasible mitigation has been identified but the residual impact remains significant after mitigation is applied. Therefore, the impact is considered significant and unavoidable.

The analysis of potential impacts and mitigation measures is based on pre-determined significance criteria. The significance criteria used in this EIR are taken from the Environmental Checklist Form included in the CEQA Guidelines (CEQA Guidelines, Appendix G). Significance criteria are denoted by an abbreviated form of the topic area and numbered (e.g., AIR-1 for Air Quality Significance Criterion 1). Mitigation measures are denoted by an abbreviated form of the topic area and lettered (e.g., AIR-A for Air Quality Mitigation Measure 1).

Where impacts are significant, feasible mitigation measures are presented. The ~~Draft~~ EIR then evaluates the effectiveness of mitigation measures in reducing the significant impact to less than significant levels.

In some cases, when impacts are not significant and thus no mitigation is required, the ~~Draft~~ EIR nevertheless discusses "voluntary" mitigation measures that would further reduce the less-than-significant impact. Sometimes these are mitigation measures that have already been developed for other impacts but would also reduce a less-than-significant impact, and sometimes they are new mitigation measures. At the end of the CEQA process, CEQA findings regarding the effectiveness of mitigation measures will not be made for less-than-significant impacts, because such findings are required only for significant impacts per CEQA Guidelines Section 15091(a).

Evaluation of potential impacts is reported for two stretches of the project area: (1) the entire stretch of channel encompassed by Reaches 1 through 3, and (2) Reach 4 alone. For each resource area, potential impacts are described for Reaches 1–3 and then again for Reach 4. In some cases, impacts are not different between these two areas and are addressed together (All Reaches).

Impact assessment takes into consideration construction and operational impacts. Construction impacts are those that may occur during implementation of construction actions, and are compared to baseline conditions occurring in Year 2015.

Operational impacts are those that may occur after the project has been completed. After completion of work under this project, ongoing maintenance of the Upper Berryessa Creek channel area would be conducted under the Stream Maintenance Program 2 (SMP2), following the methods described in the 2014-2023 SMP2 Program Manual (SCVWD 2014). The SMP has been reviewed and adopted in compliance with CEQA requirements.

Because the proposed project is being designed to result in less erosion due to lower flow velocities, more stable bank design, and enhanced flow conveyance through bridges and culvert openings, operations and SMP2 maintenance actions associated with sediment removal and repair of eroded banks or access roads are likely to be reduced in magnitude compared to existing channel operations and maintenance activities. In addition to the existing maintenance activities conducted by SMP2, the District would inspect and maintain the new floodwalls and other project structures constructed as part of the proposed project. In accordance with USACE standards for flood control structures including floodwalls, woody vegetation would be prevented from growing from within 15 feet of the floodwall. Growth of other (i.e. non-woody) vegetation would be prevented within 5 feet of the floodwall. The floodwalls and other structures would be visually inspected on a monthly basis and graffiti removed if necessary. Measures needed to maintain the floodwalls, UPRR culvert, and other project structures would be detailed in guidelines prepared for the maintenance and operation of the newly constructed channel. These additional maintenance and operation activities would result in little or no disturbance of soils or biological resources, and are not likely to have a significant effect on other resources. Therefore, the assessment of impacts from operations and maintenance assumes that such impacts would be reduced from those occurring under current conditions, unless otherwise indicated in the analysis.

3.2. AESTHETICS

This section describes the visual resources and aesthetic condition of the project area and surrounding lands. Aesthetic conditions along Upper Berryessa Creek are evaluated using the visual assessment methodology developed by the Federal Highway Administration (FHWA 1988), which includes five distinct steps: (1) identify the viewshed, (2) inventory landscape units, (3) evaluate landscape units for visual quality, (4) evaluate potential impacts to those visual resources, and (5) identify what measures will reduce impacts to visual quality. Steps 1 through 3 are completed in the existing conditions section below. Step 4 is completed in the impacts section below, and Step 5 in the mitigation section.

3.2.1. Environmental Setting

Upper Berryessa Creek lies mostly within the City of Milpitas, with a small portion of Reach 4 in the City of San Jose, and passes through urbanized communities. Commercial and industrial land uses comprise most of the project area, and two small residential communities are adjacent to the project area. The creek flows under a pedestrian bridge, five roadway overpasses, two UPRR overpasses, and several utility lines. The creek channel is artificial and composed of long, nearly straight stretches separated by roadway overpasses and two unnaturally acute channel bends. The channel cross-section is a nearly uniform trapezoid with over-steepened banks and sparse vegetation. Collectively, the creek's artificial form and sparse vegetation reduce its aesthetic appeal. Aesthetic conditions in the project area are

characterized by urbanization, high traffic areas, industrial land uses, business parks, gravel and dirt access roads, lack of native vegetation, incision of the channel, trash, graffiti, and erosion.

3.2.2. Existing Conditions

3.2.2.1. *Viewer Groups*

The viewshed that is identified in Step 1 of the FHWA methodology is the area that can be seen from the project footprint, as well as the areas from which the project can be viewed. Determining the viewshed requires an understanding of the existing viewer groups. Along Upper Berryessa Creek, viewer groups include motorists, pedestrians, bicyclists, business park employees, industrial employees, railroad users, and local residents.

MOTORISTS. Motorists would only briefly view the project area when traversing overpasses on Montague Expressway, Ames Avenue, Yosemite Drive, Los Coches Street and Calaveras Boulevard. Due to the oblique angle of viewing from the road overpasses, most motorists would see very little of the project area, and for only brief moments. Milpitas Boulevard parallels the creek for about 1,500 feet and views from that road are more extensive. However, the creek reach adjacent to Milpitas Boulevard is aesthetically unattractive due to the straight ditch-like form, lack of substantial vegetation, adjacent railroad tracks, number of billboards, and industrial uses in the area.

PEDESTRIANS AND CYCLISTS. Similarly, pedestrians and cyclists on overpasses would have only short-term views, though they would likely be able to see more details of the creek itself than would motorists. Though signs indicate that trespassing is prohibited, pedestrians and cyclists occasionally use access roads along both sides of the creek. Gates restrict automobile access to most of the access roads. A small pocket park with exercise equipment and about 460 linear feet of paved trail is present on the east bank of the creek a short distance upstream of Los Coches Street, which provides a creek view to its users.

LOCAL EMPLOYEES. Employees of local businesses also have the opportunity to experience the visual quality of Upper Berryessa Creek. Many of the businesses have little or no exposure to the creek alignment due to closed warehouses with few windows, fencing, and to a lesser degree, natural vegetation screening. However, several buildings have windows and/or outdoor sitting/picnicking areas facing the creek or parking lots without fencing or other barriers to the creek, and employees are exposed to the creek's visual resources on a daily and long-term basis.

UPRR EMPLOYEES. Employees of UPRR may also experience Upper Berryessa Creek's visual surroundings on a daily or long-term basis. The UPRR track runs along the east bank from just upstream of Ames Avenue to just downstream of Montague Expressway, with a spur line running to Los Coches Street on the west bank. In some locations, multiple tracks are present, or pass over the creek itself.

RESIDENTS. Residents with homes that back up to the creek are the most constant viewer group. Two small residential areas are adjacent to the creek, including homes just upstream of Los Coches Street on the east bank, and an apartment complex and neighborhood on the west bank that extends from I-680 downstream to the westernmost bend in the project area.

3.2.2.2. *Step 1 - Identify the Viewshed*

The viewshed for Upper Berryessa Creek is restricted by development on both banks. Viewers within the project footprint would be able to see several hundred or thousand feet when looking upstream or downstream, but only very short distances looking perpendicular to the flow of water. Distant glimpses are possible of the Los Buellis Hills, which are designated a visually significant hillside in the Milpitas General Plan, and which rise above residential and commercial buildings.

Each of the viewer groups would experience different visual resources; motorists and others using overpasses would have only brief views of the area, while local residents and employees may have long-term, daily exposure to the area. Local workers and residents would therefore be more sensitive to visual conditions of the project area.

3.2.2.3. *Step 2 - Inventory Landscape Units*

Step 2 of the FHWA methodology is to inventory the landscape for "units" of visual condition. In contrast to FHWA highway construction projects, this project area does not extend great distances through a variety of ecotones. It is a short stretch of highly altered and urbanized creek with little visual variation. Four reaches have been defined through the project area, separated by hydrologic and vegetative similarities, and will serve as suitable landscape units for the purposes of this evaluation. Please note that these reaches differ from the rest of the document, where Reaches 1–3 are evaluated as a whole, and Reach 4 is evaluated alone.

1. *Reach 1*: This reach extends from Calaveras Boulevard to Los Coches Street.
2. *Reach 2*: Los Coches Street to the confluence of Piedmont and Upper Berryessa Creeks.
3. *Reach 3*: Piedmont Creek confluence upstream to Montague Expressway.
4. *Reach 4*: Montague Expressway upstream through two 90-degree bends and ending at the I-680 overpass.

3.2.2.4. *Step 3 - Evaluate Units for Visual Quality*

This step requires evaluation of the reaches and description of any visually sensitive landscape resources. Step 3 yields a score for the existing conditions of the project area, based on vividness, intactness, and unity (FHWA 1988). Scoring has been determined utilizing FHWA guidance and best professional judgment during field investigations conducted in August 2014.

The FHWA system scores the visual quality of a landscape based on its deviation from natural conditions, or quality of aesthetics given the changes that have been made. High scores are given to landscapes that most closely resemble their natural, unaltered state. Low scores are given where the land has been altered, degraded, or severely encroached upon. However, not all altered landscapes are low-scoring. Scenic overlooks, historic districts, and heritage landscapes may all achieve high scores. Scoring should consider those visually sensitive landscapes identified by law at the Federal, State, or local level, or which have been designated by local ordinance.

When characterizing visual quality, it is beneficial to reduce subjectivity through the use of established characteristics. The FHWA method characterizes visual quality using the terms vividness, intactness, and unity. Vividness is scored from low to high based on the visual power of the area; is it striking or does it have a distinctive quality? Intactness refers to the integrity of the aesthetics; is the area free from encroachment? Unity can be described by the coherent nature of the landscape; has it maintained a

harmonious pattern? For each of the landscape units described (reaches), each of these characteristics is given a score of low (1), moderately low (2), moderate (3), moderately high (4), or high (5).

Visual resources along Upper Berryessa Creek do not vary dramatically and are typically all characterized as being poor or low quality.

REACH 1. For this reach, each of the FHWA characteristics is given low scores (1). Reach 1's visual condition was driven by three distinct characteristics; the extensive surrounding urbanization; the very limited native vegetation and natural habitats; and the linear uniform cross-section of the creek channel.

Vegetation in the area is primarily non-native. The creek channel is highly altered with unnaturally steep banks, and the gravel access roads are the dominant feature. Furthermore, trash and debris are present beneath both Calaveras Boulevard and Los Coches Street overpasses, along with graffiti. The creek and access roads are linear with no meandering. Access roads are maintained to be cleared of vegetation. Creek banks are chemically treated and mowed to reduce vegetation. Rock revetment, trash, and debris are present intermittently through this stretch. Retail outlets back up to the access road on the west bank, though no windows offer views to the creek. Non-native trees, primarily palm trees, provide a visual screen of development on the east bank.

Throughout this reach typical flows are less than 1 foot deep. Water is generally clear, though trash and algae are present. Unpleasant odors were not noted to originate from the creek when soil sample pits were excavated for the wetland delineation performed in August 2014 (Tetra Tech 2015b).

REACH 2. Visual quality is low (1) for all characteristics in this reach. From Los Coches Street to Piedmont Creek there is little variation in visual condition of the creek and access roads. It has minimal riparian vegetation along the bottom of the channel, which is incised and straight, and flanked by two maintained gravel roads. Incision increases in the upstream portion of this reach. Again, banks are sprayed and/or mowed and have little vegetation. Stream flow was less than 1 foot deep. Distinct reach features include the confluences of Los Coches and Piedmont Creeks with Upper Berryessa Creek, as well as a residential pocket park where permanent outdoor exercise equipment is present.

At the confluence with Los Coches Creek, incision, erosion, debris, rock revetment, and trash all compromise visual quality. Los Coches Creek is highly incised with extremely steep slopes. Concrete bank and bed lining and sacked concrete slopes, much of which is failing due to undercutting, reduce the visual quality of the creek.

East of Upper Berryessa Creek and south of Los Coches Creek, a number of residences back up to the project area. Behind these homes, a pedestrian pathway follows the backyard alignment of the homes and a set of publicly owned and available outdoor fitness equipment has been erected. Landscaping, trees, and recreational facilities occur at the immediate top of bank at this location.

Commercial and retail businesses often have unobstructed access to the access roads on the west bank. In these areas, boulders have been placed to prevent motor access. This allows for some unity of visual resources, where trees and large boulders mark the right-of-way boundary, but this occurs in only a very limited area.

UPRR tracks are present along the east side of the creek for most of this reach. Piedmont Creek enters the project area from the east, passing beneath the UPRR trestle prior to joining Upper Berryessa Creek. Piedmont Creek water flow is typically less than 1 foot deep.

REACH 3. The downstream limit of Reach 3 begins near the confluence with Piedmont Creek. Upstream of Piedmont Creek, Upper Berryessa Creek has little or no water outside of precipitation events. Standing water is present in some lower elevation areas.

Visual quality is low (1) for all characteristics in this reach. There is little vegetation and abundant urbanization, with no integration of urban and creek landscapes. The landscape is not memorable or dynamic, is not intact due to erosion and incision, and has no unity due to harsh creek edges, linear alignments, and access roads.

All bridge crossings in the project area have been tagged by graffiti and often have a collection of spent paint cans littering the area. Trash bags, tires, eroding rock revetment, mattresses, and shopping carts were also observed under bridges and in the right-of-way.

REACH 4. Low (1) scores are given for unity and intactness in Reach 4. The dominant qualities of the area are extensive urbanization, lack of integration of urban areas and creek, linear nature of the channel with two artificial nearly right-angle bends lined with concrete, incision of the channel, and erosion. A small stand of trees occurs at the easternmost bend in the creek, allowing for a moderately low (2) score for vividness overall. This stand of trees is composed of coast live oaks, cottonwoods, and ornamental trees. These trees are not part of the City of San Jose's heritage tree program (Resolution No. 75974 2011).

At both bends in the creek, as well as some length downstream of I-680, the streambed and banks are lined with concrete, further reducing visual quality of the area. This is in contrast to the rest of the project area downstream, where bank hardening occurs only where bridges and outfalls are present.

The largest area of residential development occurs in this reach, stretching from I-680 to the downstream bend on the west side of the creek. In this same stretch, there is no access road between the creek and residential area; instead, fences back up to the immediate top of bank. Several trees occur along the backyard fences, both within backyards and within the right-of-way.

Visual features discussed above are illustrated in Figures 3.1 through 3.4.

Top: Looking downstream toward Calaveras Blvd. **Bottom**: Looking downstream toward Calaveras Blvd.

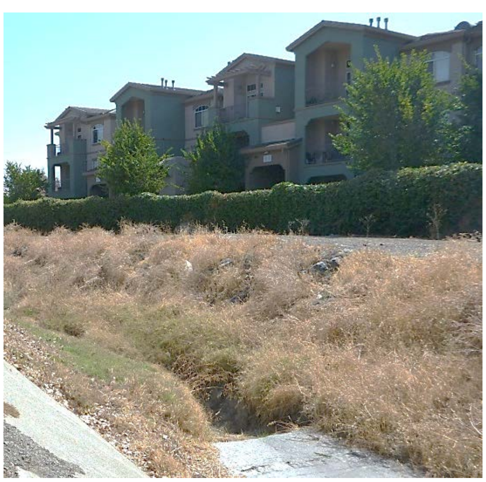
Figure 3.1 Typical Conditions, Reach 1

***Top**: Looking upstream through representative Reach 2 stretch.* ***Middle**: Residential area with pocket park.* ***Bottom Left**: Erosion undercutting bank hardening.* ***Bottom Right**: Example of trees forming visual screen between urban and creek landscapes.*

Figure 3.2 Typical Conditions, Reach 2

***Top**: Typical Reach 3 stretch. **Bottom Left**: Erosion under Yosemite Drive Bridge pier. **Bottom Right**: Looking downstream toward Yosemite Drive.*

Figure 3.3 Typical Conditions, Reach 3



***Top**: Pedestrian overpass at I-680. **Bottom Left:** Residential development upstream of westernmost bend. **Bottom Right**: Riparian trees at upstream most bend.*

Figure 3.4 Typical Conditions, Reach 4

3.2.2.5. *Scores Summary*

Scores for FHWA characteristics, as shown in Table 3.1, are low for all reaches, except for the vividness score in Reach 4. For most of the channel, the original landscape is no longer evident. The constructed creek is straight and channelized, with no natural creek or floodplain features. Cross-sections vary from a trapezoidal shape, with slopes of varying degrees, to U-shape, where stream banks are steep and eroding. Most plants are weedy non-natives. Urbanization and channelization of the creek have been approached in disparate methods, resulting in little integration of the two features. As a result, visual elements in the area are not dynamic or harmonious, and no opportunities have been taken to improve upon visual conditions. Reach 4 receives a slightly higher overall score of 1.3, which results from the presence of the upland stand of trees at the upstream bend near I-680. Mature oaks and other species form a gallery forest that increases the vividness score to moderately low (2).

Table 3.1 Visual Assessment Scores (Existing Conditions)

Characteristic	Reach 1	Reach 2	Reach 3	Reach 4
Vividness	1 (ML)	1 (L)	1 (L)	2 (ML)
Intactness	1 (L)	1 (L)	1 (L)	1 (L)
Unity	1 (L)	1 (L)	1 (L)	1 (L)
Average Score	**1 (L)**	**1 (L)**	**1 (L)**	**1.3 (L)**
L: Low, ML: Moderately Low (FHWA 1988)				

3.2.3. **Regulatory Setting**

3.2.3.1. *Federal Regulations*

There are no federal statutes or regulations directly relevant to the proposed project’s aesthetic impacts.

3.2.3.2. *State Regulations*

The California Scenic Highway Program, governed by the Streets and Highways Code, §260 et seq., is intended to preserve and protect highway corridors in areas of outstanding natural beauty from changes that would diminish the aesthetic value of the adjacent lands. There are no Caltrans-designated scenic highways in the project area or vicinity (Caltrans 2009). Construction and operation of the project would not be subject to the requirements of the Scenic Highway Program.

3.2.3.3. *Local Plans and Policies*

CITY OF MILPITAS GENERAL PLAN. With the exception of stretches of approximately 2,000 feet of the left bank and 1,600 feet of the right bank in Reach 4, which are located in San Jose, the project area is found within the City of Milpitas (Figure 3.14). The Guiding Principles listed in the Scenic Resources and Routes section of the City of Milpitas General Plan, Open Space and Environmental Conservation Element emphasize the preservation and enhancement of visual resources and encourage activities that facilitate viewing access of these resources. The Implementing Policies that support the Guiding Principles generally focus on imposing restrictions to new development projects, guiding landscaping activities and signage along scenic corridors and routes, and other site-specific policies. Scenic Routes

are present within the project area and several guiding principles apply to these areas (City of Milpitas 2002):

- 4.g-I-7. Ensure that all landscaping within and adjoining a Scenic Corridor or Scenic Connector enhances the City's scenic resources by utilizing an appropriate scale of planting, framing views where appropriate, and not forming a visual barrier to views; and relates to the natural environment of the Scenic Route; and provides erosion control.
- 4.g-I-8. Undertake a program in cooperation with PG&E to underground, relocate or screen utility lines and transmission towers within or easily visible from Scenic Routes.
- 4.g-I-11. Undertake an evaluation of and implement any necessary steps to ensure that the design and location of signs within and adjoining Scenic Routes do not lead to unsightly and obtrusive conglomerations of advertising.
- 4.g-I-12. Undertake a program to place appropriate and consistent Scenic Route identification signs periodically along all Scenic Routes. Also provide instructional signs and displays, where appropriate, along Scenic Routes and at roadside facilities, indicating major visual features of the area.

The General Plan also designated the future Berryessa Creek Trail, which runs along the study area from Montague Expressway to just upstream of Los Coches Street, plus three other arterials that branch off this trail, as Scenic Routes. Calaveras Boulevard within the project area is designated as a Scenic Connector. Scenic corridors and connectors are streets or other routes that pass through an area of scenic value, provide efficient connections between such areas, or provide distant views of scenic resources. In addition, the Population and Growth Chapter of the Milpitas General Plan provides this guidance:

- 2.a-I-17. Foster community pride and growth through beautification of existing and future development.

ENVISION SAN JOSE 2040 GENERAL PLAN. Approximately 2,000 feet of the left bank and 1,600 feet of the right bank in Reach 4 are located in the City of San Jose (Figure 3.14). The City of San Jose's General Plan (2011) provides the following guidance for aesthetic conditions, including tree protection:

- MS-21.4 Encourage the maintenance of mature trees, especially natives, on public and private property as an integral part of the community forest. Prior to allowing the removal of any tree, pursue all reasonable measures to preserve it.
- CD-1.23 Further the Community Forest Goals and Policies in this plan by requiring new development to plant and maintain trees at appropriate locations on private property and along public street frontages. Use trees to help soften the appearance of the built environment, help provide transitions between land uses, and shade pedestrian and bicycle areas.
- CD-1.25 Apply Riparian Corridor Goals and Policies of this plan when reviewing development adjacent to creeks.
- Development adjacent to creekside areas should incorporate compatible design and landscaping, including appropriate setbacks and plant species that are native to the area or are compatible with native species.
- Development should maximize visual and physical access to creeks from the public right-of-way while protecting the natural ecosystem. Consider whether designs could incorporate linear parks along creeks or accommodate them in the future.

San Jose's General Plan also provides guidelines for protecting transportation routes that are categorized as Rural Scenic Corridors or Gateways. However, transportation corridors within the project

area are not categorized as such. I-680 is considered an Urban Throughway, but does not have visual guidelines specific to that category.

3.2.4. Significance Criteria

The proposed project would result in a significant impact on visual resources if the project would:

- **AES-1** Have a substantial adverse effect on a scenic vista;
- **AES-2** Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway;
- **AES-3** Significantly degrade the existing visual character or quality of the site and its surroundings; or
- **AES-4** Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area.

3.2.5. Potential Impacts

3.2.5.1. *Significance Criteria with No Impacts*

Certain criteria are not discussed further in this EIR because the proposed project would not result in impacts related to these criteria. For aesthetics, the significance criteria not discussed further are:

AES-1 **Have a substantial adverse effect on a scenic vista.** No scenic vistas are present in the project vicinity.

AES-2 **Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway.** No State scenic highways are present at the project area or vicinity and no effects to the visual resources associated with scenic highways would result.

AES-4 **Create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area or substantially affect people or properties.** No structures with glare-creating properties that would substantially affect daytime or nighttime views or substantially affect people or properties would be constructed as part of the project.

3.2.5.2. *Significance Criteria with Potential Impacts*

AES-3 SIGNIFICANTLY DEGRADE THE EXISTING VISUAL CHARACTER OR QUALITY OF THE SITE AND ITS SURROUNDINGS

Less than significant for construction; less than significant for operation

The impacts assessment is done in Step 4 of the FHWA visual assessment process (1988). In the following sections, the effects of construction and operations are described to determine significance. In addition, the anticipated future score of visual conditions is assessed using the FHWA methodology used for existing conditions. Future with-project aesthetic scores are shown in Table 3.2, below.

CONSTRUCTION (REACHES 1–3). Construction activities would have temporary or permanent effects on scenic resources in Reaches 1–3, particularly resulting from temporary removal of vegetation within the project area, earthwork, and general reduction in scenic quality resulting from the presence of construction equipment.

The presence of construction equipment, workers, and activities would temporarily obscure views of the creek and change the visual character of the area. A 2-year construction period, during which construction activities would be limited to the dry season between May and October, would result in a total of 12 months of construction (6 dry months over 2 years). During that time, the presence of trucks and other construction equipment, such as temporary fencing, would degrade the visual landscape. However, because of industrial use of the area, which results in an already compromised visual quality, the presence of construction trucks and crew would not substantially reduce aesthetic quality in the project area. Furthermore, the presence of trucks and crew would be temporary and would not result in a permanent impact on visual quality or reduction in viewer group response. Though there would be an impact to visual condition, the temporary nature of the impact and the only incremental degradation in an already industrial area would result in a less than significant adverse effect.

A total of 74,500 cubic yards of material would be excavated and 19 acres of vegetation would be cleared from Reaches 1 to 3. The presence of open earth cuts, along with the removal of grasses and other vegetation necessary to excavate the trapezoidal channels, would temporarily reduce aesthetic attractiveness of the area. Disturbed areas would be hydroseeded as part of construction completion, and would reestablish vegetative cover comparable to before-project conditions.

The project areas scenic resources include trees that have either been planted or become voluntarily established within the channel right-of-way. Construction of the proposed project requires the removal of ~~44~~ 45 native trees and shrubs and additional non-native landscape trees/shrubs from Reaches 1 to 3 to increase the channel size and construct top of bank access roads (see Appendix F).

Trees/shrubs to be removed include non-natives such as Australian willows, eucalyptus, citrus, and pine and native trees/shrubs, including California nutmeg, coast live oak, coyote brush, elderberry, Fremont cottonwood, redwood, toyon, valley oak, and white alder (see Appendix F). Trees and shrubs along the channel provide a visual screen to the channel, generally improving the aesthetic quality of the area. Trees also provide shade to pedestrians. In most cases, trees that are providing visual improvements to the channel would not be removed. Trees that provide screening and shade are typically beyond the area needed to be cleared. Trees that will be removed are sparsely located throughout the channel or right-of-way, and as a result do not form a natural condition. When removed, these sparsely located trees would not leave a visual gap. Other trees surrounding the area would remain, and viewer groups are unlikely to notice a significant reduction in vegetation after the completion of the project. Therefore, this impact would be less than significant.

In Reach 2 upstream of Los Coches Street, the small pocket park with exercise equipment and adjoining recreational trail would be removed during construction. Along with the park, an area of landscaping containing native toyons, coyote brush, and Fremont cottonwoods would be removed. The removal of this feature would constitute a change to the visual character of the area, but because it is a small area, the permanent visual impact would be less than significant.

Project compliance with the City of Milpitas Tree Maintenance and Protection Ordinance and City of San Jose Tree Protection Ordinance is analyzed under Significance Criterion BIO-5 in Section 3.5.5.

FHWA Visual Assessment Scores for Reaches 1 to 3

In most cases, overall visual scores are anticipated to improve slightly when compared to the existing condition. This is due to increased intactness scores, resulting from the benefits of repairing eroding banks, sloping banks back to allow for improved vegetation growth, and increased flood conveyance.

In Reach 1, intactness scores increase, resulting in a slight improvement in aesthetic assessment scoring for Reach 1 (Table 3.2). Reaches 2 and 3 receive slightly higher overall scores as a result of improvements to intactness. Although scores would be expected to decrease for unity under all alternatives as a result of floodwall construction, the existing conditions scores were already at the lowest scoring point. Slight improvements are seen in the scores for each alternative as a result in the improved intactness of the area. However, scores still fall within the low category for Reaches 1, 2, and 3. Reach 4 receives a moderately low score. Overall, there will be only incremental increases in visual quality according to application of the FHWA methodology for each reach.

Table 3.2 Visual Assessment Scores (Proposed Conditions)

	Reach 1	Reach 2	Reach 3	Reach 4
Vividness	1 (L)	1 (L)	1 (L)	2 (ML)
Intactness	2 (ML)	2 (ML)	2 (ML)	2 (ML)
Unity	1 (L)	1 (L)	1 (L)	1 (L)
Average Score	**1.3 (L)**	**1.3 (L)**	**1.3 (L)**	**1.7 (L-ML)**
L: Low, ML: Moderately Low (FHWA 1988)				

CONSTRUCTION (REACH 4). The types of impacts occurring in Reach 4 would generally be the same as those occurring in Reaches 1–3, including temporary removal of vegetation within the project area, earthwork, and general reduction in scenic quality resulting from presence of construction equipment. However, in this reach a total of 15,500 cubic yards (cy) of material would be excavated, and only minimal amounts of vegetation, consisting mostly of grasses and forbs, would be removed. Eight native trees/shrubs, consisting of an arroyo willow, 4 coast live oaks, and 3 Fremont cottonwoods would likely be removed in Reach 4 (see Appendix F). The creek banks would be hydroseeded to re-establish low vegetation. Visual impacts of vegetation removal would be temporary and would occur within an already industrialized area, resulting in a less than significant impact.

The proposed project would result in the removal a small number of trees in Reach 4. The number of trees to be removed is small and would not result in a visual gap. Furthermore, the mixed stand of native and non-native riparian trees at the easternmost bend in Reach 4, which contains 27 mostly native trees, would be mostly protected during construction. Although a majority of trees in this area would not be removed, 4 coast live oaks and 3 Fremont cottonwoods growing low on the bank would likely be removed during sediment removal in this area. This stand of trees is the only area where trees are standing together and not sparsely located, which creates an increased sense of it being a more natural area. Leaving most of these trees would ensure that the proposed project's tree removal would not result in a significant visual impact.

FHWA Visual Assessment Scores for Reach 4

In general, the visual assessment results are similar to those in Reaches 1–3. As shown in Table 3.2, Reach 4 receives a slightly higher score in comparison to existing conditions as a result of the replacement of concrete channel with earthen side slopes, but it still receives a moderately low score.

OPERATIONS AND MAINTENANCE (ALL REACHES). Visual quality would be improved overall following completion of the proposed project, due to the expansion of the channels, sloping and stabilization of the banks, replacement of the UPRR trestle, reestablishment of native vegetation along bank channels, and addition of transition structures between bridges and channel. Trash and graffiti would continue to accumulate, but would be removed through ongoing SMP2 maintenance activities.

A newly constructed free-standing concrete floodwall with a length of about 2,200 ft and a maximum height of 2 feet between Los Coches and Yosemite Drive would constitute a new visual feature in the project area. However, due to the already industrialized and altered character of the project area, the floodwall would not substantially reduce aesthetic quality of the area. Although another floodwall would be constructed in Reach 4, it would be buried and would have no impact on visual resources.

Maintenance schedules and activities would not be substantially different from the before-project condition. Future operations and maintenance of the proposed project would not result in increased presence of trucks or crews and would result in a less than significant impact to aesthetics.

Proposed Project Photo-simulations

Photo-simulations of three selected locations show the existing conditions of the channel the visual appearance of the creek after construction of the proposed project (Figures 3.5 to 3.7) and demonstrate impacts to the visual character of the site and its surroundings. These are conceptual images that simulate the general configuration of the channel, side slopes, access roads, and other features. The photo-simulations are designed to give the appearance of the channel after all construction is complete and once vegetation has become fully reestablished, approximately 1 to 3 years after construction.

Figure 3.5 shows the projected appearance of the channel looking upstream from Calaveras Boulevard. Features in this reach include sloping of creek banks, creation of a wetland mitigation terrace on the left (west) bank, engineering of the confluence of Piedmont Creek and Berryessa Creek using rock revetment (seen in the distance on both banks), and placement of a maximum 3-foot concrete floodwall between the access road and channel. Toe-down rock revetment installed to stabilize channel slopes would become overgrown once vegetation is reestablished. TRMs would be installed on the upper banks to anchor vegetation, but would be largely unseen after vegetation becomes reestablished. Figure 3.6 shows a conceptual diagram of the railroad trestle replacement with box culvert and sloping of banks. This photo-simulation is looking upstream at the existing UPRR railroad trestle. Figure 3.7 shows a section of the channel where the existing concrete bed and bank lining would be removed at a sharp bend in the channel, and replaced with buried rock revetment and side slopes vegetated with native grasses and forbs. This photo-simulation looks upstream at the first bend upstream of Montague Expressway. The existing concrete lining at the second bend upstream of Montague Expressway and trees growing on the east bank would remain in place. The visual appearance of the channel at this second bend would be mostly unchanged from its current appearance. Overall visual impacts in Reach 4 would be less than significant.

Figure 3.5 Photo-simulation A (Completed Project): Terraced Wetland, Floodwall, and confluence with Piedmont Creek

Figure 3.6 Photo-simulation B (Completed Project): UPRR Trestle Replacement with Box Culvert

Figure 3.7 Photo-simulation C (Completed Project): Concrete Removal Upstream of Montague Expressway

Based on the above analysis, impacts of proposed project construction and operation on the visual character of the project site and surroundings would be less than significant.

MITIGATION (ALL REACHES) (NOT REQUIRED). Although Impact AES-2 would be less than significant, Mitigation Measure BIO-B, which addresses replacement of native trees and shrubs removed during construction, would also reduce visual impacts. This mitigation measure is more fully described in Section 3.5.6.

3.2.6. Statement of Impact

Table 3.3 summarizes the level of potential impacts to visual resources.

Table 3.3 Statement of Impacts, Aesthetics

Impact	Before Mitigation	Applicable Mitigation Measures	Residual Impact After Mitigation
AES-1. Have a substantial adverse effect on a scenic vista	NI	None	NI
AES-2. Substantially degrade scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway	NI	None	NI
AES-3. Substantially degrade the existing visual character or quality of the site and its surroundings	LS	BIO-B	LS
AES-4. Create a new source of substantial light or glare that would adversely affect daytime or nighttime views or affect people or properties	NI	None	NI
NI–No Impact, LS–Less than Significant, LM–Less than Significant with Mitigation, S–Significant, SU–Significant and Unavoidable			

3.3. AIR QUALITY

This section describes the ambient air quality of the project area, discusses the applicable air quality regulations, and analyzes the potential effects of the proposed project on air quality in the region. This section also presents the results of air quality modeling that was performed for the proposed project, and describes mitigation measures that would be implemented.

3.3.1. Environmental Setting

Air quality is affected by the rate, amount, and location of pollutant emissions and the associated meteorological conditions that influence pollutant movement and dispersal. Atmospheric conditions (wind speed, wind direction, and air temperature) in combination with local surface topography (geographic features such as mountains and valleys) determine how air pollutant emissions affect local air quality.

Air pollution potential in the Santa Clara Valley is high. High summer temperatures, stable air, and mountains surrounding the valley, which prevent dispersion of pollutants, combine to promote ozone formation. In addition to the many local sources of pollution, ozone precursors from San Francisco, San Mateo, and Alameda Counties are carried by prevailing winds to the Santa Clara Valley. The shape of the

valley tends to channel pollutants to the southeast. In addition, on summer days with low level temperature inversions, ozone can be recirculated by southerly drainage flows in the late evening and early morning and by the prevailing northwesterly winds in the afternoon. A similar recirculation pattern occurs in the winter, affecting levels of carbon monoxide (CO) and particulate matter. This movement of the air up and down the valley increases the impact of the pollutants substantially.

3.3.2. Existing Conditions

The Bay Area Air Quality Management District (BAAQMD) has jurisdiction over air quality conditions in Santa Clara County, as well as eight other counties in the surrounding area. The area regulated by the BAAQMD is in non-attainment status for ozone under both the California Air Quality Standards (CAAQS) and National Air Quality Standards (NAAQS), and also is in non-attainment under the California standards for particulate matter (PM_{10} and $PM_{2.5}$). The BAAQMD area is in attainment for all other listed air pollutants under both the California and Federal standards (BAAQMD 2013). Standards are summarized in Table 3.4.

The BAAQMD operates a regional monitoring network that measures ambient concentrations of criteria pollutants. The nearest monitoring station to the project area is the San Jose Central Monitoring Station. Table 3.5 presents monitoring data for the most recent 5 years for which data are available at this station. The table shows the number of times each year that each station records pollutant concentrations in excess of the Federal or California air quality standards. The table also lists the highest annual reading for each pollutant at the station.

Table 3.4 State and Federal Air Quality Standards

Pollutant	Averaging Time	State Standard	Federal Standard
Ozone (O_3)	1 Hour 8 Hour	0.09 ppm 0.070 ppm	- 0.075 ppm
Carbon Monoxide (CO)	1 Hour 8 Hour	20 ppm 9.0 ppm	35 ppm 9 ppm
Nitrogen Dioxide (NO_2)	1 Hour Annual	0.18 ppm 0.030 ppm	0.100 ppm 0.053 ppm
Sulfur Dioxide (SO_2)	1 Hour 3 Hour 24 Hour Annual	0.25ppm - 0.04 ppm -	- 0.5 ppm 0.14 ppm 0.03 ppm
Respirable Particulate Matter (PM_{10})	24 Hour Annual	50 µg/m^3 20 µg/m^3	150 µg/m^3 -
Fine Particulate Matter ($PM_{2.5}$)	24 Hour Annual	- 12 µg/m^3	35 µg/m^3 15.0 µg/m^3
Lead	Monthly Quarterly	1.5 µg/m^3 -	- 1.5 µg/m^3
Notes: ppm = parts per million, µg/m^2 = micrograms per cubic meter			

Table 3.5 San Jose Central Monitoring Station Air Quality Data Summary						
Pollutant	**Standard[a]**	**Monitoring Data by Year**				
		2009	**2010**	**2011**	**2012**	**2013**
Ozone						
Highest 1 hour average, ppm	0.090 ppm	.088	.0126	.098	.0101	.0093
Days over state standard		0	5	1	1	0
Highest 8 hour average, ppm	0.070 ppm (state)	.068	.086	.067	.062	.079
Days over state standard		0	3	0	0	1
Days over national standard	0.075 ppm (national)	0	3	0	0	1
Nitrogen Dioxide (NO_2)						
Highest 1 hour average, ppm	0.25 ppm	.0069	.0064	.0061	.0067	.0059
Days over state standard		0	0	0	0	0
Annual Average, national	0.053 ppm	.0148	.014	.015	.013	.015
Carbon Monoxide (CO)						
Highest 8 hour average, ppm	9.0 (state & national)	2.5	2.2	2.5	2.6	3.1
Days over state/national standard		0	0	0	0	0
PM_{10}						
Highest 24 hour average, state/national, µg/^{3}	50 (state) 150 (national)	43.0	47.0	44.0	60.0	58.0
Estimated days over state/national standard[b]	State Stds:	0	0	0	1	5
	National Stds:	0	0	0	0	0
$PM_{2.5}$						
Highest 24 hour average, µg/m^3	35 (national)	35.0	41.5	50.5	38.4	57.7
Estimated days over national standard[b]		0	3	3	2	6

Notes: ppm=parts per million; µg/m^3 = micrograms per cubic meter; **Bold** values are in excess of applicable standards.

[a] Generally, State standards are not to be exceeded and Federal standards are not to be exceeded more than once per year. Standard listed here is the 2013 standard; previous year standards may differ slightly.

[b] Measurements are collected every 3 days at San Jose. "Estimated days" represents an estimated number of days that the standard would have been exceeded if levels were sampled every day of the year.

3.3.2.1. *Sensitive Receptors*

Air quality does not affect every individual in the population in the same way, and some groups are more sensitive to adverse health effects than other groups. Population subgroups sensitive to the health effects of air pollutants include the elderly and the young, those with higher rates of respiratory disease such as asthma and chronic obstructive pulmonary disease, and subgroups with other environmental or occupational health exposures (e.g., indoor air quality) that affect cardiovascular or respiratory diseases. Land uses such as schools, children's day care centers, hospitals, and nursing and convalescent homes are the most sensitive to poor air quality because the population groups associated with these uses have higher susceptibility to respiratory distress. Parks and playgrounds are considered moderately sensitive to poor air quality because persons engaged in strenuous work or exercise also have increased sensitivity to poor air quality. However, exposure times are generally far shorter in parks and playgrounds than in residential locations and schools, which typically result in lower levels of pollutant exposure. Residential areas are more sensitive to air quality conditions compared to commercial and industrial areas because people generally spend more time at their residences, with greater associated exposure to ambient air quality conditions.

REACHES 1–3. The project area is highly developed. The area is generally commercial/industrial with limited residential uses. Receptors include the employees of the businesses and residents in the

neighborhoods located adjacent to the creek. The Western Learning Center, a childcare facility, is located approximately 800 feet from the project area (within the analytic zone of influence of the BAAQMD CEQA Guidelines), but not adjacent to where work would occur. There are no schools, hospitals or convalescent homes in the project vicinity, although a small pocket park is found in Reach 2 on the east side of the creek. Figure 3.8 shows the sensitive air quality receptors in the project area.

REACH 4. As with Reaches 1–3, the project area is in a highly developed area. Downstream of I-680 is a mostly commercial/industrial area with some residential uses, in which receptors include the employees of local businesses, residents of the neighborhoods located adjacent to the creek and Northwood Elementary School, located approximately 700 feet from the creek.

3.3.3. **Regulatory Setting**

3.3.3.1. *Federal Regulations*

CLEAN AIR ACT (CAA). The Federal Clean Air Act (42 USC 7401, et seq.) delegates primary enforcement of air quality standards to the states, with direct oversight by the U.S. Environmental Protection Agency (EPA). The CAA, which was last amended in 1990, requires EPA to set National Ambient Air Quality Standards (NAAQS) (40 CFR part 50) for pollutants considered harmful to public health and the environment. The CAA established two types of standards. Primary standards were established to promote human health with an adequate margin of safety to protect those most vulnerable such as asthmatics, infants, and elderly persons. Secondary standards were established to promote human welfare to prevent impaired visibility, building and crop damage, and other non-health related values.

The CAA established NAAQS for several air pollutants. The six pollutants that are analyzed when examining air quality include ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), inhalable particulate matter (PM_{10} and $PM_{2.5}$ – particulates 10 microns or less in diameter and 2.5 microns or less in diameter, respectively), and lead.

Construction activity would occur with the proposed project, and fuel-fired construction equipment is a mobile source of air pollution. Mobile sources can trigger the need for a General Conformity Determination (40 CFR Part 93, Subpart B) if they are emitting sufficiently large quantities of an air pollutant in an area designated "non-attainment" with respect to a current NAAQS, or which was previously designated "non-attainment" with respect to a current NAAQS (and is therefore a "maintenance" area). In such areas, a Federal agency must make a determination that permitting or approving an activity would conform to the State Implementation Plan (SIP) when the total of direct and indirect emissions (of the non-attainment/maintenance pollutant, or its precursors) in that area would equal or exceed *de minimis* levels identified in 40 CFR Part 93 Subpart B, which vary depending on the pollutant and attainment status but are no higher than 100 tons per year.

AMBIENT AIR QUALITY STANDARDS. Areas are classified as either attaining (attainment) or not attaining (non-attainment) State and Federal ambient air quality standards. These classifications are made by comparing actual monitored air pollutant concentrations to State and Federal standards. If a pollutant concentration is lower than the State or Federal standard, the area is considered to be in attainment of the standard for that pollutant. If pollutant levels exceed a standard, the area is considered a non-attainment area. If data are insufficient to determine whether a pollutant is violating the standard, the area is designated unclassified.

To implement Section 176 of the CAA, the EPA issued the General Conformity Rule, which states that a Federal action must not cause or contribute to any violation of the NAAQS, or delay timely attainment of air quality standards. In order to meet this CAA requirement, a Federal agency such as USACE must demonstrate that every action that it undertakes, approves, permits or supports would conform to the appropriate SIP. A conformity determination is required for each pollutant where the total of direct and indirect emissions caused by a Federal action in a non-attainment (or maintenance) area exceeds *de minimis* rates listed in the rule (40 CFR 93.153). The *de minimis* rates are 50, 100, 50, 100, and 100 tons per year for NOx, CO, Volatile Organic Compounds (VOCs), PM_{10}, and $PM_{2.5}$, respectively.

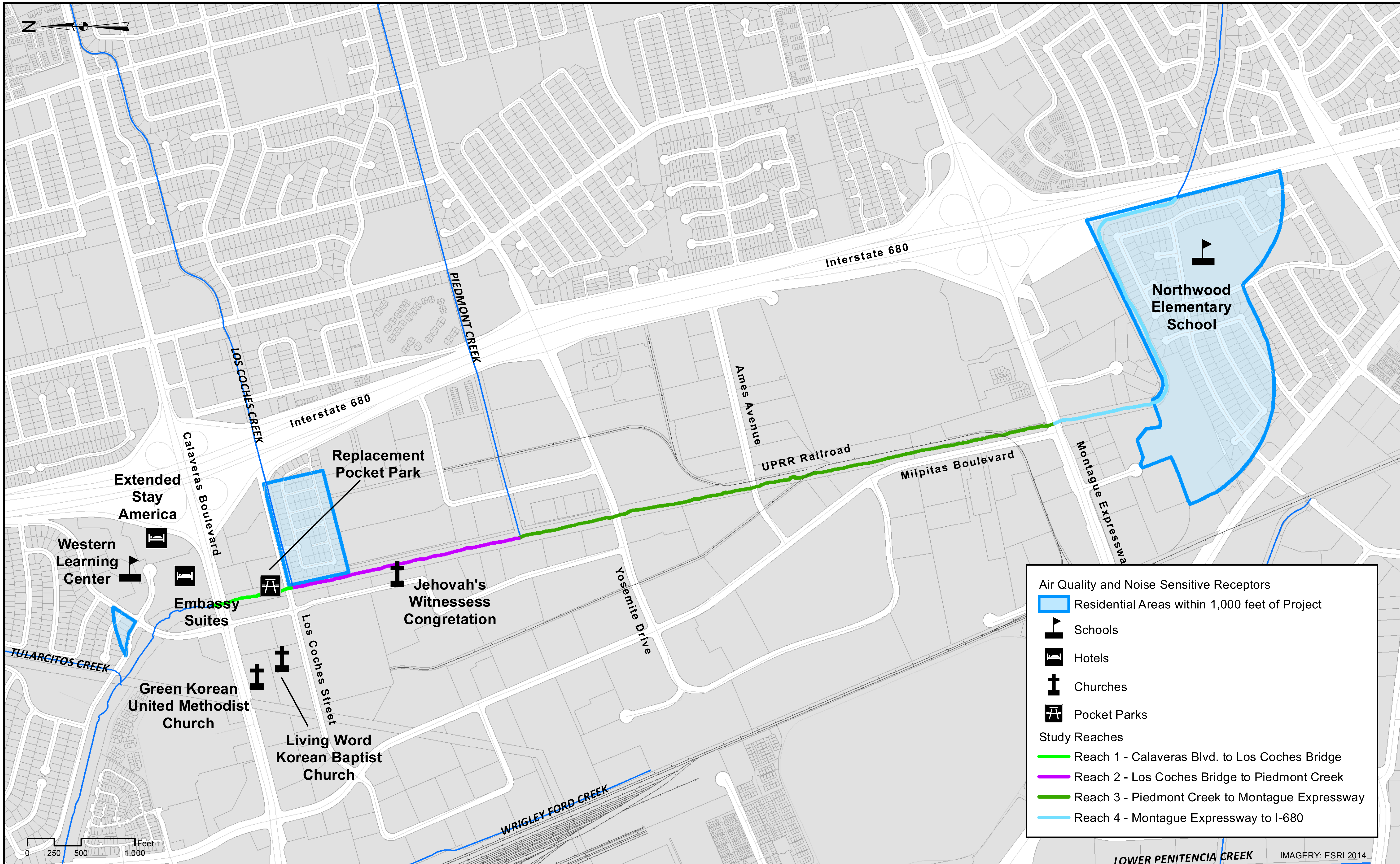


Figure 3.8 Sensitive Receptors in Project Area

Tetra Tech
17885 Von Karman Avenue, Suite 500
Irvine, CA 92614
Tel. (949) 809-5000 Fax. (949) 809-5003

Santa Clara Valley Water District

UPPER BERRYESSA CREEK
FLOOD RISK MANAGEMENT PROJECT

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3.3.3.2. *State Regulations*

CALIFORNIA CLEAN AIR ACT. The California Air Resources Board (CARB) is the agency responsible for coordination and oversight of State and local air pollution control programs in California and for implementing the California Clean Air Act (CCAA). The CCAA, which was adopted in 1988, required CARB to establish California ambient air quality standards (CAAQS). The standards for criteria pollutants established by CARB are generally more restrictive than the NAAQS. Differences in the standards are generally explained by the health effects studies considered during the standard-setting process and the interpretation of the studies. In addition, the CAAQS incorporate a margin of safety to protect sensitive individuals. The California and National Standards are summarized in Table 3.4 above.

CARB has also established CAAQS for sulfates, hydrogen sulfide, vinyl chloride, and the criteria air pollutants described below. Sulfates are generally formed by the combustion of petroleum-derived fuels that contain sulfur and their subsequent conversion to sulfate compounds in the atmosphere. Hydrogen sulfide is primarily generated by the decomposition of sulfur-containing organic substances and vinyl chloride, a chlorinated hydrocarbon, and is typically detected near landfills, sewage plants, and hazardous waste sites due to microbial breakdown of chlorinated solvents. Emissions of these pollutants are not expected to result from implementation of the proposed project; therefore, they are not mentioned further in this document.

Ozone

Ozone is a respiratory irritant and an oxidant that increases susceptibility to respiratory infections and that can cause substantial damage to vegetation and other materials. Ozone is not emitted directly into the atmosphere, but is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving reactive organic gases (ROG) and nitrogen oxides (NOx). ROG and NOx are known as precursor compounds for ozone. Significant ozone production generally requires ozone precursors to be present in a stable atmosphere with strong sunlight for approximately 3 hours.

Ozone is a regional air pollutant because it is not emitted directly, but is formed downwind of sources of ROG and NOx under the influence of wind and sunlight. Ozone concentrations tend to be higher in the late spring, summer, and fall, when the long sunny days combine with regional subsidence inversions to create conditions conducive to the formation and accumulation of secondary photochemical compounds such as ozone.

Carbon Monoxide

CO is a non-reactive pollutant that is a product of incomplete combustion and is mostly associated with motor vehicle traffic. High CO concentrations develop primarily during winter when periods of light winds combine with the formation of ground level temperature inversions (typically from the evening through early morning). These conditions result in reduced dispersion of vehicle emissions. Motor vehicles also exhibit increased CO emission rates at low air temperatures. When inhaled at high concentrations, CO combines with hemoglobin in the blood and reduces the oxygen-carrying capacity of the blood. This results in reduced oxygen reaching the brain, heart, and other body tissues. This condition is especially critical for people with cardiovascular diseases, chronic lung disease, or anemia.

Particulate Matter

PM_{10} and $PM_{2.5}$ represent fractions of particulate matter that can be inhaled into air passages and the lungs and can cause adverse health effects. Particulate matter in the atmosphere results from many

kinds of dust and fume-producing industrial and agricultural operations, fuel combustion, and atmospheric photochemical reactions. Some sources of particulate matter, such as demolition and construction activities, are more local in nature, while others, such as vehicular traffic, have a more regional effect. Very small particles of certain substances (e.g., sulfates and nitrates) can cause lung damage directly or can contain adsorbed gases (e.g., chlorides or ammonium) that may be injurious to health. Particulates can also damage materials and reduce visibility.

Other Criteria Pollutants

SO_2 is a combustion product of sulfur or sulfur containing fuels such as coal. SO_2 is also a precursor to the formation of atmospheric sulfate and particulate matter (both PM_{10} and $PM_{2.5}$) and contributes to potential atmospheric sulfuric acid formation that could precipitate downwind as acid rain.

Lead has a range of adverse neurotoxin health effects, and was formerly released into the atmosphere primarily via leaded gasoline. The phase out of leaded gasoline in California resulted in decreasing levels of atmospheric lead.

The CCAA requires that all local air districts in the State endeavor to achieve and maintain the CAAQS by the earliest practical date. The act specifies that local air districts should focus particular attention on reducing the emissions from transportation and area wide emission sources, and provides districts with the authority to regulate indirect sources (i.e., sources that are not stationary or regulated as a stationary source, such as construction sources).

BAY AREA AIR QUALITY MANAGEMENT DISTRICT. The BAAQMD has local jurisdiction over the project area. BAAQMD is responsible for bringing and/or maintaining air quality in the basin within Federal and State air quality standards. Specifically, BAAQMD has the responsibility to monitor ambient air pollutant levels throughout the basin and to develop and implement strategies to attain the applicable Federal and State standards.

The CAA and the CCAA require State Implementation Plans to be developed for areas designated as non-attainment (with the exception of areas designated as non-attainment for the State PM_{10} standard). For State air quality planning purposes, the Bay Area is classified as a serious non-attainment area for the 1-hour ozone standard. The “serious” classification triggers various plan submittal requirements and transportation performance standards. One such requirement is that the BAAQMD update the Clean Air Plan (CAP) periodically to reflect progress in meeting the air quality standards and to incorporate new information regarding the feasibility of control measures and new emission inventory data. The most recent update is the Bay Area 2010 CAP, which:

- Updates the Bay Area 2005 Ozone Strategy in accordance with the requirements of the California Clean Air Act to implement “all feasible measures” to reduce ozone;
- Considers the impacts of ozone control measures on particulate matter, air toxics, and greenhouse gases in a single, integrated plan;
- Reviews progress in improving air quality in recent years; and
- Establishes emission control measures to be adopted or implemented in the 2010 to 2012 timeframe.

The BAAQMD is preparing an update to the 2010 CAP and expects to complete it by early 2016 (C. Riviere, personal communication, 2015).

3.3.3.3. *Local Plans and Policies*

CITY OF MILPITAS GENERAL PLAN. The Milpitas General Plan, most recently amended in 2002, addresses air quality primarily from the transportation perspective through its discussion of transportation demand management techniques to meet BAAQMD and State of California air quality standards. A Climate Action Plan was approved in 2013 and is discussed in Section 3.8, Greenhouse Gas Emissions.

ENVISION SAN JOSE 2040 MASTER PLAN. The City of San Jose's Master Plan addresses air quality by way of goals and policies. Specifically, Goal MS-10 seeks to minimize air pollutant emissions from new and existing development. Policies to achieve this goal include:

- MS-10.1 Assess projected air emissions from new development in conformance with the BAAQMD CEQA Guidelines and relative to State and Federal standards. Identify and implement feasible air emission reduction measures.
- MS-10.2 Consider the cumulative air quality impacts from proposed developments for proposed land use designation changes and new development, consistent with the region's Clean Air Plan and State law.

3.3.4. **Significance Criteria**

Impacts on air quality would be significant if the proposed project would:

AIR-1 Conflict with or obstruct implementation of the applicable air quality plan;

AIR-2 Violate any air quality standard or contribute substantially to an existing or projected air quality violation;

AIR-3 Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable Federal or State ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);

AIR-4 Expose sensitive receptors to substantial pollutant concentrations; or

AIR-5 Create objectionable odors affecting a substantial number of people.

In June 2010, the BAAQMD adopted CEQA thresholds of significance for agencies to use to assist with environmental review of projects. These thresholds were designed to establish the level at which BAAQMD believed air pollutant emissions would cause significant impacts under CEQA. For construction emissions, the BAAQMD recommended a threshold of 54 pounds per day for ROG, NOx, and $PM_{2.5}$ construction emissions and a threshold of 82 pounds per day for PM_{10}. For operational emissions, the BAAQMD recommended a threshold of 54 pounds per day or 10 tons per year for ROG, NOx, and $PM_{2.5}$ construction emissions and a threshold of 82 pounds per day or 15 tons per year for PM_{10}. The BAAQMD did not recommend quantitative thresholds for construction dust emissions; instead, impacts are considered less than significant if the BAAQMD-recommended Best Management Practices are employed to control dust during construction activities, including demolition and excavation. The 2010 BAAQMD CEQA Guidelines recommend analyzing localized CO concentrations for projects that would increase traffic volumes at affected intersections to more than 44,000 vehicles per hour.

In developing thresholds of significance for air pollutants, BAAQMD considered the emission levels for which a project's individual emissions would be cumulatively considerable. If a project exceeds the

identified significance thresholds, its emissions would be considered cumulatively considerable, and additional analysis to assess cumulative impacts would be unnecessary.

It should be noted that the BAAQMD's adoption of its guidelines in 2010 was challenged in court and in March 2012, the Alameda County Superior Court ruled that BAAQMD needed to comply with CEQA prior to adopting the guidelines. The Superior Court did not determine whether the thresholds were valid on the merits, but found that the adoption of the thresholds was a project under CEQA. On appeal, the First Appellate District Court of Appeal reversed the trial court's decision. The Court of Appeal's decision was appealed to the California Supreme Court, which granted limited review, and the matter is currently pending. In view of the trial court decision, which remains in place pending final resolution of the case, the BAAQMD is no longer recommending that its thresholds be used as a generally applicable measure of a project's significant air quality impacts. However, the BAAQMD noted that lead agencies may rely on its updated guidelines for assistance in calculating air emissions, obtaining information regarding health impacts of air pollutants, and identifying potential mitigation measures. Lead agencies need to determine appropriate air quality thresholds of significance based on substantial evidence in the record. The District has independently reviewed BAAQMD-recommended thresholds from June 2010 including BAAQMD's Justification Report which explains the agency's reasoning for adopting the thresholds, and determined that they are supported by substantial evidence and are appropriate for use to determine significance in the environmental review of this project. Specifically, the District has determined that the BAAQMD thresholds are well-founded and supported by air quality regulations, scientific evidence, and scientific reasoning concerning air quality and greenhouse gas emissions.

3.3.5. Potential Impacts

Air emissions from construction-related activities were calculated by inputting construction-related data into the Sacramento Metropolitan Air Quality Management District's Road Construction Emissions Model, Version 7.1.5.1 (2013). The model was run to generate separate emission values for construction activities in Reaches 1–3 and in Reach 4. This model is approved for use on linear construction projects such as this by the BAAQMD (Kirk, personal communication, 2015). Appendix B presents air quality model data sheets.

The modeling assumed that all construction activity would begin in 2017 and be completed in either one 1-year construction season or two 6-month construction seasons. The estimated equipment to be used, volume of material, and disturbance acreages were compiled to determine the data to input into the emissions model. The emission calculations are based on standard vehicle emissions rates built into the model.

The Road Construction Emissions Model provided emission estimates for ROG, NOx, CO, carbon dioxide (CO_2), PM_{10}, and $PM_{2.5}$. ROG and NOx are precursors to ozone formation. The emissions values for PM_{10} and $PM_{2.5}$ consist of a combination of exhaust particles, especially diesel exhaust and fugitive dust. Federal standards refer to VOCs instead of ROG, but both of these types of emissions are ozone precursors and function similarly in ozone formation.

3.3.5.1. *Significance Criteria with No Impacts*

There would be no impact related to the following significance criteria:

AIR-1 Conflict with or obstruct implementation of the applicable air quality plan(s). The BAAQMD develops Air Quality Management Plans (AQMPs) based on projected population growth and associated increases in emissions, and considers projects consistent with AQMPs as long as they would not induce population growth beyond that included in projections used to formulate the AQMP. Additionally, BAAQMD suggests that projects which increase vehicle-miles traveled at a greater rate than population growth be considered inconsistent with the AQMP. During the most intensive phase of the project (grading/excavation), the project actions in Reaches 1-3 would generate 800 vehicle-miles traveled, compared to Milpitas VMT of 446,980/day, or 2/100 of 1%. For work in Reach 4, 800 VMT would be generated, compared to San Jose VMT of 8,349,000, or 1/1000th of 1%. Given that the proposed project would not induce population growth or result in a substantial increase in vehicle-miles traveled, it is consistent with the applicable AQMP and no impact would occur.

3.3.5.2. *Significance Criteria with Potential Impacts*

AIR-2 VIOLATE ANY AIR QUALITY STANDARD OR CONTRIBUTE SUBSTANTIALLY TO AN EXISTING OR PROJECTED AIR QUALITY VIOLATION
Significant and unavoidable for construction; less than significant for operations

Project actions including channel excavation, construction of floodwalls, replacement of the UPRR trestles, and excavation of the channel would result in temporary and short-term generation of ROG, NOx, PM_{10}, $PM_{2.5}$, and CO emissions from excavation, vegetation clearing, grading, motor vehicle exhaust associated with construction equipment, ~~construction,~~ employee commute trips, material transport, operation of diesel power generators, material handling and other construction activities. Using the Road Construction Emissions Model software, which is a model approved by BAAQMD and CARB for CEQA use, annual emissions were calculated based on assumptions on the type of construction equipment required. Construction activities and associated assumptions associated with air quality are estimated based on the current level of design, and the activities and emissions may change based on the contractor's approach. The estimated annual emissions are identified in Tables 3.6 and 3.7.

CONSTRUCTION (REACHES 1–3). Based on the emission estimates presented in Table 3.6, the proposed project would generate emissions below the General Conformity Rule *de minimis* values for emissions of criteria pollutants during implementation of Federal projects. The estimated worst-case daily emissions generated from construction of the proposed project would exceed BAAQMD thresholds for construction-period NOx emissions. The proposed project would violate local air quality standards. This would be a significant impact because the BAAQMD threshold is based on the potential for a project to cause air quality standard violations.

The proposed project would result in minimal changes in traffic volumes during construction and would not increase the traffic volumes at any project area intersection from below 44,000 to above 44,000. The two busiest intersections in the project area are Calaveras Boulevard/ Hillview Drive and Montague Expressway/ South Milpitas Boulevard. During construction, the proposed project would add less than 1 percent to the traffic volumes using these intersections on a daily basis. The increases in traffic volumes due to project construction would be negligible. Therefore, project effects on CO levels at those intersections would be less than significant.

Table 3.6 Modeled Air Quality Emissions for the Proposed Project (Reaches 1-3)						
Criteria Pollutants	**ROG**	**CO**	**NO_x**	**PM_{10}**	**$PM_{2.5}$**	**CO_2**
Estimated Daily Emissions	8.9 lbs.*	48.1 lbs.*	99.2 lbs.*	24.5 lbs.*	8.2 lbs.*	12,526 lbs.*
Estimated Project Emissions	<1 ton	4.9 tons	9.1 tons	2.7 tons	<1 ton	1,110 tons
BAAQMD Project Construction Thresholds	54 lbs./day	N/A	54 lbs/day	72 lbs/day	54 lbs/day	N/A
Federal Conformity Rule Thresholds	50 tons/year**	100 tons/year**	50 tons/year**	100 tons/year**	N/A	N/A
Exceed Thresholds	No	No	Yes	No	No	No

ROG = reactive organic gases, NO_x = nitrogen oxides, CO = carbon monoxide, CO_2 = carbon dioxide, PM_{10} = particulate matter less than 10 microns $PM_{2.5}$ = particulate matter less than 2.5 microns, *Represents maximum pounds per day, usually during grading/excavation phase
** Per year or for construction period, whichever is shorter
Source: Appendix B

CONSTRUCTION (REACH 4). Based on the estimated emissions presented in Table 3.7, construction of the proposed project within Reach 4 would generate air emissions that are less than the General Conformity Rule *de minimis* values for criteria pollutants. Construction activities in Reach 4 would also not exceed BAAQMD significance thresholds for criteria pollutants with the exception of NOx. The emissions of NOx at levels exceeding BAAQMD significance thresholds would be a significant impact because the BAAQMD threshold is based on the potential for a project to cause air quality standard violations.

As stated in the analysis of Reaches 1-3, the proposed project would result in minimal changes in traffic volumes during construction and would not increase the traffic volumes at any project area intersection from below 44,000 to above 44,000, and the increases in traffic volumes due to project construction would be negligible. Therefore, project effects on CO levels would be less than significant.

Table 3.7 Modeled Air Quality Emissions for the Proposed Project (Reach 4)						
Criteria Pollutant	**ROG**	**CO**	**NO_x**	**PM_{10}**	**$PM_{2.5}$**	**CO_2**
Estimated Daily Emissions	8.2 lbs.*	44.3 lbs.*	88.2 lbs.*	24.2 lbs.*	8.0 lbs.*	9,815 lbs.*
Estimated Project Emissions	<1 ton	<1 ton	8.4 tons	2.7 tons	<1 ton	928 tons
BAAQMD Project Construction Thresholds	54 lbs./day	N/A	54 lbs./day	72 lbs./day	54 lbs./day	N/A
Federal Conformity Rule Thresholds	50 tons/year**	100 tons/year**	50 tons/year**	100 tons/year**	N/A	N/A
Exceed Thresholds	No	No	Yes	No	No	No

ROG = reactive organic gases, NO_x = nitrogen oxides, CO = carbon monoxide, CO_2 = carbon dioxide, PM_{10} = particulate matter less than 10 microns, $PM_{2.5}$ = particulate matter less than 2.5 microns.
*	Represents maximum pounds per day, usually during grading/excavation phase.
** Per year or for construction period, whichever is shorter

OPERATIONS (ALL REACHES). In Reaches 1–3, inspection of floodwalls and the new culverts on the UPRR railroad tracks and crossing Los Coches Creek, would result in increased vehicular trips l, adding about one vehicle trip per month. Overall, emissions resulting from operations and maintenance would be reduced as the constructed project is expected to result in reduced needs for periodic sediment removal and erosion control. This would result in less use of trucks and excavation equipment, which are the primary sources of emissions associated with operations and maintenance, and less generation of fugitive dust. Impacts from operations and maintenance would be less than significant.

MITIGATION. To reduce the amount of NOx emissions during construction activities, Mitigation Measures AIR-A and AIR-B would be implemented. These mitigation measures are described in Section 3.3.4, and would reduce emissions by optimizing the efficiency of motors used in construction equipment, and using equipment most efficiently. Although particulate impacts are less than significant, Mitigation Measure AIR-A would further reduce particulate emissions.

SIGNIFICANCE AFTER MITIGATION. The proposed mitigation measures would reduce the emission level of NOx but would not be able to reduce the level to below the significance thresholds. After implementation of mitigation measures AIR-A and AIR-B, and assuming up to 20 percent reduction of NOx emissions through use of Best Available Technology in all vehicles, the proposed project would still result in significant and unavoidable emissions of NOx in Reaches 1–3 and Reach 4. No additional feasible measures have been identified that could further reduce this impact to a less than significant level. Dust control measures and other measures to reduce equipment exhaust emission would further ensure that impacts for all other criteria pollutants would be less than significant for all reaches.

AIR-3 CUMULATIVELY CONSIDERABLE NET INCREASE IN ANY CRITERIA POLLUTANT FOR WHICH THE AREA IS IN NON-ATTAINMENT

Significant and unavoidable for construction; less than significant for operations

CONSTRUCTION (REACHES 1–3). BAAQMD thresholds of significance identify emissions levels at which an individual project would have a cumulatively considerable impact on air quality. As discussed under Impact AIR-1, particulate emissions would be below local significance thresholds, but NOx emissions from construction would be above local significance thresholds. Therefore, based on the significance thresholds identified in the 2010 BAAQMD CEQA Guidelines, implementation of the proposed project would result in a cumulatively considerable increase in criteria pollutant emissions, resulting in a significant impact.

CONSTRUCTION (REACH 4). Impacts occurring in Reach 4 would be reduced compared to Reaches 1–3 since there would be less construction activity. Particulate emissions would be less than significant, but emissions of NOx would be above local significance thresholds, resulting in a significant impact.

OPERATIONS (ALL REACHES). The proposed project would increase maintenance and operations activities above the baseline by adding inspections and maintenance of floodwalls and the UPRR culvert. The expected increase in vehicle trips would be less than one per month, which would result in negligible and less than significant air quality impacts.

MITIGATION. To reduce the NOx impact from construction activities, Mitigation Measures AIR-A and AIR-B would be implemented during construction. These mitigation measures are described in Section 3.3.4, and would reduce NOx emissions by optimizing the efficiency of motors used in construction equipment and using equipment most efficiently. Although particulate impacts are less than significant, Mitigation Measure AIR-A would further reduce particulate emissions.

SIGNIFICANCE AFTER MITIGATION. The proposed mitigation measures would reduce construction-period emissions of NOx by up to 20 percent, but would not reduce NOx emissions to below the significance thresholds. As a result, this impact would be significant and unavoidable**.**

AIR-4 EXPOSE SENSITIVE RECEPTORS TO SUBSTANTIAL POLLUTANT CONCENTRATIONS

Less than significant for construction; less than significant for operations

CONSTRUCTION (ALL REACHES). The potential for significant impacts associated with exposure of sensitive receptors to substantial pollutant concentrations is generally highest for projects where construction activities that generate high levels of diesel particulate matter and $PM_{2.5}$ occur within close proximity to sensitive receptors such as nursing homes, hospitals, or schools, and where busy intersections are likely to cause haul trucks to be delayed and increase idling time extensively.

Modeled emission estimates shown in Table 3.7 for CO, PM_{10}, and $PM_{2.5}$ would remain well below local significance thresholds. Emissions associated with haul trucks and heavy equipment would be dispersed across different parts of the 2.5-mile construction since construction would likely occur at multiple locations at any given time, so $PM_{2.5}$ and toxic emissions would not be concentrated in any given location. Haul trucks would leave the construction area via arterials with good flow, and enter the freeway shortly thereafter. There are no sensitive receptors within close proximity to haul routes or

construction areas, as shown in Figure 3.8. Therefore, the proposed project is not likely to expose sensitive receptors to substantial pollutant concentrations, and this impact would be less than significant.

OPERATION (ALL REACHES). The proposed project would increase maintenance and operations activities above the baseline by adding inspections and maintenance of floodwalls and the UPRR culvert. The expected increase in vehicle trips would be less than one per month, which would result in negligible emissions of air pollutants. Operational impacts associated with releases of substantial pollutant concentrations would be less than significant.

MITIGATION (ALL REACHES) (NOT REQUIRED). As described above, the impact from construction and operation/maintenance activities would both be less than significant, and no mitigation measures are required. However, implementation of Mitigation Measures AIR-A and AIR-B to address Impacts AIR-2 and AIR-3 would also reduce Impact AIR-4.

AIR-5 CREATE OBJECTIONABLE ODORS AFFECTING A SUBSTANTIAL NUMBER OF PEOPLE

Less than significant for construction; less than significant for operations

CONSTRUCTION (REACHES 1–3). Construction activities would produce occasional odors from diesel equipment exhaust and possibly from exposure of organic materials in the excavation process. Odors resulting from use of diesel powered equipment are likely to disperse quickly and would likely only affect people in close proximity to the construction zone. The number of people in this area is not expected to be substantial; therefore, impacts from this source would be less than significant.

Objectionable odors may also be caused by excavation of anoxic wetland soils, particularly those with high concentrations of organic materials that convert to hydrogen sulfide in anoxic environments. Such soils are generally associated with marshes or other areas where soils are frequently saturated and where organic materials are allowed to decompose on site. Few such soils are likely to occur in the project area, and the project area is primarily industrial with few sensitive receptors. Therefore, this impact would be less than significant.

CONSTRUCTION (REACH 4). Construction activities would produce occasional odors from diesel equipment exhaust and possibly from exposure of organic materials in the excavation process. Odors resulting from use of diesel powered equipment are likely to disperse quickly and would likely only affect people in the direct vicinity of the construction zone. Saturated wetland soils would not likely be encountered in Reach 4, so impacts associated with odors would be less than significant.

OPERATIONS (REACHES 1–3). Saturated wetland soils found in Reaches 1–3 may be odiferous. However, soils excavated during sediment removal would be disposed of off-site immediately, and therefore impacts would be less than significant.

OPERATIONS (REACH 4). Saturated wetland soils are not expected to occur in Reach 4, so no impacts associated with odors are expected.

3.3.6. Mitigation Measures

AIR-A: REDUCE CONSTRUCTION-PERIOD DUST EMISSIONS

The District will work with the USACE to require the construction contractor to implement the following measures during construction to reduce particulate emissions. Many of these measures would also reduce NO_x emissions.

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
- All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
- All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
- Water used to wash the various exposed surfaces (e.g., parking areas, staging areas, soil piles, and graded areas) would not be allowed to enter waterways.
- All vehicle speeds on unpaved roads shall be limited to 15 mph.
- All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible.
- Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
- Vegetative ground cover (e.g., fast-germinating native grass seed) shall be planted in disturbed areas as soon as possible and watered appropriately until vegetation is established.
- The simultaneous occurrence of excavation, grading, and ground-disturbing construction activities on the same area at any one time shall be limited. Activities shall be phased to reduce the amount of disturbed surfaces at any one time.
- All trucks and equipment, including their tires, shall be washed off prior to leaving the site.
- Site accesses to a distance of 100 feet from the paved road shall be treated with a 6- to 12-inch compacted layer of wood chips, mulch, or gravel.
- Sandbags or other erosion control measures shall be installed to prevent silt runoff to public roadways from sites with a slope greater than one percent.
- Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations), and this requirement shall be clearly communicated to construction workers (such as verbiage in contracts and clear signage at all access points).
- All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications, and all equipment shall be checked by a certified visible emissions evaluator.
- Correct tire inflation shall be maintained in accordance with manufacturer's specifications on wheeled equipment and vehicles to prevent excessive rolling resistance.
- Post a publicly visible sign with a telephone number and contact person at the lead agency to address dust complaints; any complaints shall be responded to and corrective action shall be taken within 48 hours. In addition, a BAAQMD telephone number with any applicable regulations would be included.
- Install one or more of the following track-out prevention measures:
  - A gravel pad designed using good engineering practices to clean the tires of exiting vehicles,
  - A tire shaker,
  - A wheel wash system,

- Pavement extending for not less than 50 feet from the intersection with the paved public road,
- Suspend any excavation operations when wind speeds are high enough to result in dust emissions across the property line, despite the application of dust mitigation measures.
- Any other measure(s) as effective as the measures listed above.

AIR-B: REDUCE CONSTRUCTION EQUIPMENT EMISSIONS. The District will work with the USACE to require the construction contractor to implement the following measures during construction:

- Maintain all construction equipment in proper tune according to manufacturer's specifications.
- Fuel all off-road and portable diesel powered equipment with ARB certified motor vehicle diesel fuel (non-taxed version suitable for use off-road).
- Use diesel construction equipment meeting ARB's Tier 2 certified engines or cleaner off-road heavy-duty diesel engines, and comply with the State off-Road Regulation.
- Use on-road heavy-duty trucks that meet CARB's 2007 or cleaner certification standard for on-road heavy-duty diesel engines, and comply with the State On-Road Regulation.
- All on and off-road diesel equipment (except diesel generators) shall not idle for more than 5 minutes. Signs shall be posted in the designated queuing areas and or job sites to remind drivers and operators of the 5 minute idling limit.
- Diesel idling within 1,000 feet of sensitive receptors is not permitted.
- Staging and queuing areas shall not be located within 1,000 feet of sensitive receptors.
- Use electric equipment when feasible.
- Substitute gasoline-powered in place of diesel-powered equipment, where feasible.
- Use alternatively fueled construction equipment on-site where feasible, such as compressed natural gas (CNG), liquefied natural gas (LNG), propane or biodiesel.
- All construction equipment, diesel trucks, and generators shall be equipped with Best Available Control Technology for reductions of NOx and PM emissions.
- All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications, and all equipment shall be checked by a certified visible emissions evaluator.
- Correct tire inflation shall be maintained in accordance with manufacturer's specifications on wheeled equipment and vehicles to prevent excessive rolling resistance.

3.3.7. Statement of Impact

Table 3.8 summarizes potential impacts to air quality. Potential impacts to air quality associated with releases of criteria pollutants would be significant and unavoidable.

Table 3.8 Statement of Impacts , Air Quality

Impact	Prior to Mitigation	Mitigation Measures	After Mitigation
AIR-1. Conflict with or obstruct implementation of the applicable air quality plan(s)	NI	None	NI
AIR-2. Violate any air quality standard or contribute substantially to an existing or projected air quality violation	S	AIR-A AIR-B	SU

Impact	Prior to Mitigation	Mitigation Measures	After Mitigation
AIR-3. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable Federal or State ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)	S	AIR-A AIR-B	SU
AIR-4. Expose sensitive receptors to substantial pollutant concentrations	LS	AIR-A AIR-B	LS
AIR-5. Create objectionable odors affecting a substantial number of people	LS	None	LS
NI–No Impact, LS–Less than Significant, LM–Less than Significant with Mitigation, S–Significant, SU–Significant and Unavoidable			

3.4. AGRICULTURE AND FORESTRY

This section is intended to describe the existing extent of agriculture or forest lands within the project area, their condition, and required protections. Existing trees within the project area are not considered forest lands and have been addressed in the Aesthetics chapter above (Section 3.2).

3.4.1. Environmental Setting

The project area runs through a highly industrialized land use area. Though native forest lands are present to the east of the area within the Diablo Range, they do not extend to the project area. Remaining lands are unsuitable for agricultural use; all lands in the area are designated for other uses, such as industrial, commercial, or residential.

3.4.2. Existing Conditions

Historically, the Berryessa watershed alluvial fan supported agriculture, particularly where soils were suitable (U.S. Department of Agriculture 1958). Today, the combined industries of agriculture, forestry, fishing, hunting, and mining contribute only 0.1 percent to employment in Santa Clara County (U.S. Census Bureau 2010).

There are no prime or unique farmlands, nor any farmland of statewide or local importance mapped within the project area (California Department of Conservation 2011). A recent soil survey review identified soils in Santa Clara County that were candidates for listing for Prime Farmland and Farmland of Statewide Importance; no soils in the project area (Units 140, 145, 165, and 317) were included on the candidate list (Natural Resources Conservation Service [NRCS] 2010). Furthermore, there are no areas currently dedicated to farming in the project footprint or vicinity.

There are no forests or timberlands in the project footprint or the vicinity, and few trees are present along Upper Berryessa Creek. The California Department of Forestry (CDF) prepared a recent assessment of forest and rangeland throughout the State; mapping shows that there are no priority forests or rangelands in the project area or vicinity (CDF 2010).

3.4.3. Regulatory Setting

There are no agricultural or forested lands within the project footprint and, therefore, no regulatory guidance applies to the proposed project.

3.4.4. Significance Criteria

Impacts on agriculture and forestry would be significant if the proposed project would:

Ag/For-1 Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland) as shown on maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency to non-agricultural use;

Ag/For-2 Conflict with existing zoning for agricultural uses or a Williamson Act contract;

Ag/For-3 Result in the loss of forest land or conversion of forest land to non-forest use;

Ag/For-4 Conflict with existing zoning, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined in Public Resources Code Section 4526), or timberland zoned Timberland Protection (as defined by Government Code section 51104(g)); or

Ag/For-5 Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use.

3.4.5. Potential Impacts

There are no agricultural or forest lands within the project area or vicinity that are categorized such that Federal, State, or local protections would apply. Therefore, neither construction nor maintenance and operation of the proposed project would result in impacts to agriculture or forestry resources.

3.4.6. Mitigation Measures

No mitigation requirements apply to agriculture or forestry lands as the proposed project would not result in impacts to these resources.

3.4.7. Statement of Impact

Table 3.9 summarizes the level of potential impacts to agriculture and forestry.

Table 3.9 Statement of Impacts, Agriculture & Forestry

Impact	Before Mitigation	Applicable Mitigation Measures	Residual Impact After Mitigation
Ag/For-1 Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to non-agricultural use	NI	None	NI

Impact	Before Mitigation	Applicable Mitigation Measures	Residual Impact After Mitigation
Ag/For-2 Conflict with existing zoning for agricultural uses or a Williamson Act contract	NI	None	NI
Ag/For-3 Result in the loss of forest land or conversion of forest land to non-forest use	NI	None	NI
Ag/For-4 Conflict with existing zoning, or cause rezoning of, forest land, timberland, or timberland zoned Timberland Protection	NI	None	NI
Ag/For-5 Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use	NI	None	NI

3.5. BIOLOGICAL RESOURCES

Biological resources include the natural life systems existing throughout the project area. This section describes the existing vegetation, fish, and wildlife associated with Upper Berryessa Creek; the potential impacts to these biological resources; the regulations in place to protect these resources; thresholds for significance of impacts, potential impacts and mitigation measures designed to reduce impacts; and significance of impacts after application of feasible mitigation measures.

3.5.1. Environmental Setting

Upper Berryessa Creek is part of the larger Berryessa Creek system that begins in the hills of the Diablo Range within the Coyote Creek Watershed. As development grew within the creek's floodplain, the natural functions of the creek became compromised. Today, the creek is highly altered, channelized, disconnected from its floodplain, and subject to maintenance objectives for keeping the channel clear to improve flood conveyance. Habitat quality is low throughout the project area.

3.5.2. Existing Conditions

The proposed project is located in a region that has a Mediterranean climate with cool, wet winters and warm, dry summers, and receives an average of less than 15 inches of rainfall a year. The surrounding area is highly developed, and the stream channel has been modified for flow conveyance rather than optimization of ecological features.

Like many streams in coastal California, Upper Berryessa Creek is ephemeral under normal circumstances, meaning that it has flow during the wet months and is dry during the late spring, summer, and early fall. The exception to this is where runoff from urban irrigation provides artificial flows, which may allow for surface moisture throughout the year. Streamflows are composed of freshwater, as Upper Berryessa Creek is above the tidal zone.

The bottom width of the active stream channel is roughly 10 feet wide, while the distance from top of bank to top of bank ranges from 50 to 80 feet. The side slopes of the channel are almost vertical in parts of Reaches 2, 3, and 4, and bank angle in other areas typically ranges from 2:1 (2 feet horizontal to 1

foot vertical) to 4:1. A gravel access road is found along the top of the entire length of the west bank aside from a short length of Reach 4 near the stream's intersection with I-680, and another access road runs intermittently on the east bank. Parts of the bank area and the streambed in Reach 4 are covered with concrete. Concrete and other types of hardscape are found in the bed and banks intermittently in the other reaches.

3.5.2.1. *Vegetation*

The District actively maintains vegetation within the channel to enhance hydrologic conveyance. Maintenance practices include mechanical removal of vegetation and sediment from the bottom of the channel, and use of herbicides on stream banks. Regular spraying and/or mowing along stream banks prevents the establishment of woody riparian species as well as succession of vegetation communities. Flashy winter flows through the channelized system scour vegetation from the active stream channel. Trees are uncommon within the channel but are found in the vicinity in some of the upland urban environment.

A botanical survey was performed for approximately 8 miles of Upper Berryessa Creek, from Calaveras Boulevard to approximately 600 feet upstream of Old Piedmont Road. The survey report indicated that within the project area, the banks were composed mainly of non-native grassland (EDAW 2006). This survey found that species growing in or along the water's edge include knotgrass *(Paspalum distichium),* giant horsetail *(Equisetum telmateia),* and other common aquatic species (EDAW 2006). Vegetation communities were assessed during a reconnaissance-level survey performed on August 25 and 26, 2014, which assessed baseline biological conditions including vegetation, wetlands and other waters, and wildlife (Tetra Tech 2014). Vegetation in the proposed project area is highly disturbed due to frequent high-velocity flows, infestation of non-native plant species, and ongoing maintenance activities. Plant community composition varies from one reach to the next, but is relatively uniform within each reach. Vegetation patterns are distinct, correspond to topographic breaks, and are tied to hydrology. Four vegetation community types are present: (1) open water/aquatic, (2) transitional, (3) herb-dominated upland, and (4) developed (Figures 3.9 and 3.10). The altered, non-native state of each community type prevents them from being categorized into standard community descriptions such as those described in *A Manual of California Vegetation* (Sawyer et al. 2009). All plant communities are dominated by non-native species (see Table 3.10) and offer low quality habitat. The vegetation communities identified in the survey area are defined as follows:

OPEN WATER/AQUATIC VEGETATION. Aquatic vegetation is dominated by species adapted to standing water. This vegetation type occurs at the lowest elevations and only in and adjacent to the active channel. Dominant species include floating water primrose (*Ludwigia peploides*), watercress (*Rorippa nasturtium-aquaticum*), and Gila River water hyssop (*Bacopa eisenii*). The biological function of this vegetation type is limited and may include aquatic shading and nutrient removal. A total of 1.25 acres of this vegetation type was identified in the survey area, all falling within Reaches 1–3.

TRANSITIONAL VEGETATION. These are areas between aquatic areas and uplands, consisting of vegetation composed of a mix of species with life histories ranging from aquatic to drought-tolerant. Although transitional vegetation can be associated with wetland habitat, most patches function primarily as riverine due to their small size, sporadic distribution, and location below ordinary high water. Dominant species include tall flatsedge (*Cyperus eragrostis*), barnyard grass (*Echinochloa* sp.), American brooklime (*Veronica americana*), giant horsetail, and knotgrass. Biological function is limited

to slowing and diversifying flows, trapping sediment, and providing limited habitat to wildlife species adapted to aquatic habitats. A total of 3.27 acres of this vegetation type was identified in the survey area, all falling within Reaches 1–3.

HERB-DOMINATED UPLAND/GRASSLAND. These are areas with disturbed upland vegetation that is generally composed of weedy, invasive herbaceous and annual grass species. This includes ruderal land that receives regular disturbance from human activities including vegetation removal. Biological function of this vegetation type is limited to providing low-quality habitat to small vertebrates and invertebrates. A total of 8.00 acres of this vegetation type was identified in the survey area; 4.99 acres in Reaches 1–3 and 3.01 acres in Reach 4.

DEVELOPED. These areas generally contain non-native or ornamental species and cover is primarily roads, manmade structures, and landscaping. The area surrounding the creek, including virtually all of the overbank area, is composed of this cover type. Landscaped areas may provide foraging and roosting areas for birds, and are likely utilized by urban-adapted species such as squirrels and raccoons. A total of 15.47 acres of this habitat type occurs in the project area; 12.06 acres in Reaches 1–3, and 3.41 acres in Reach 4.

Vegetation density is highest downstream of Piedmont Creek in Reaches 1 and 2. Vegetation in each reach is described below and summarized in Table 3.10.

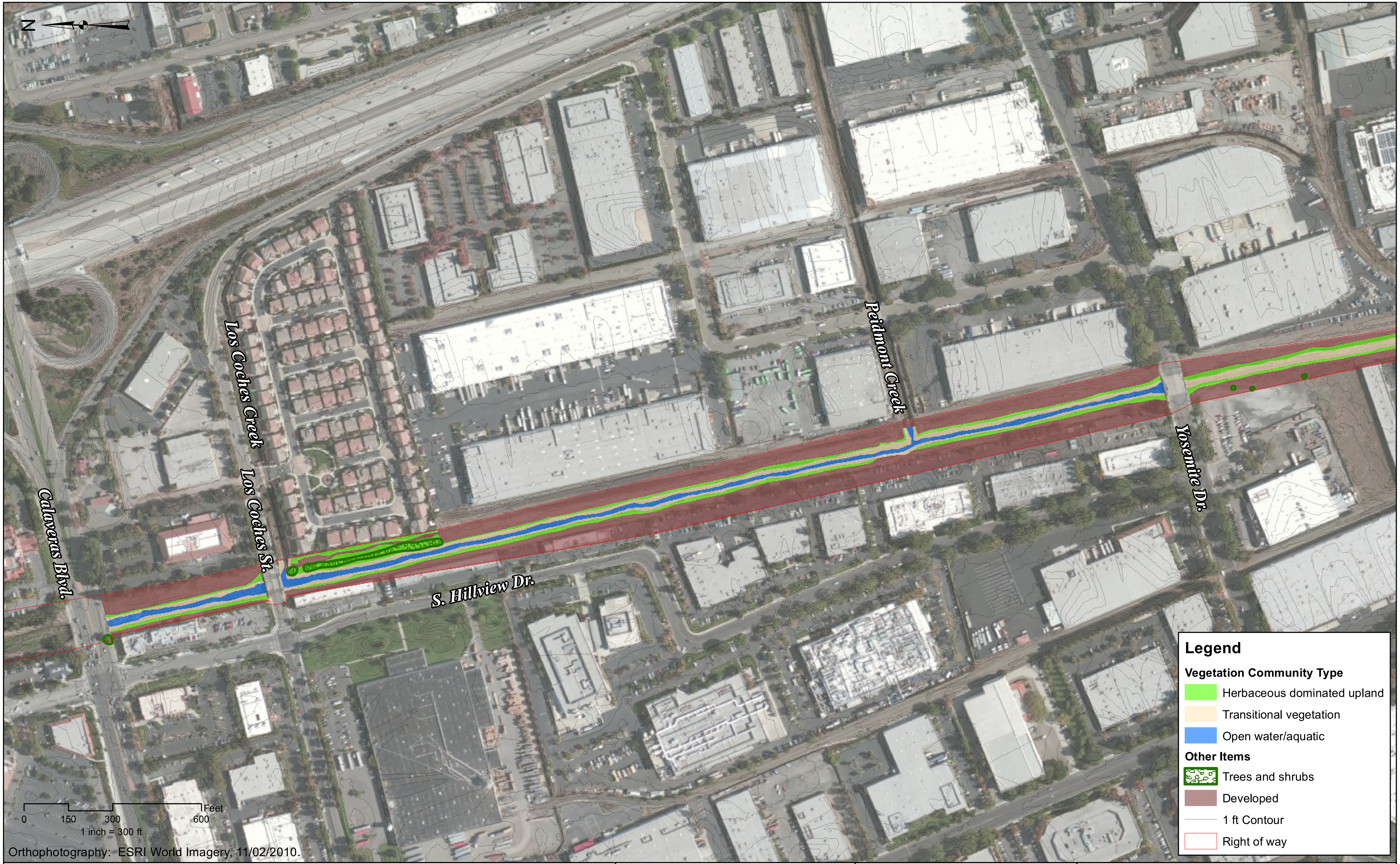

Figure 3.9 Vegetation Types, Reaches 1, 2, and downstream portion of Reach 3

Tetra Tech
17885 Von Karman Avenue, Suite 500
Irvine, CA 92614
Tel. (949) 809-5000 Fax. (949) 809-5003

Santa Clara Valley Water District

County of Santa Clara, California

UPPER BERRYESSA CREEK
FLOOD RISK MANAGEMENT PROJECT

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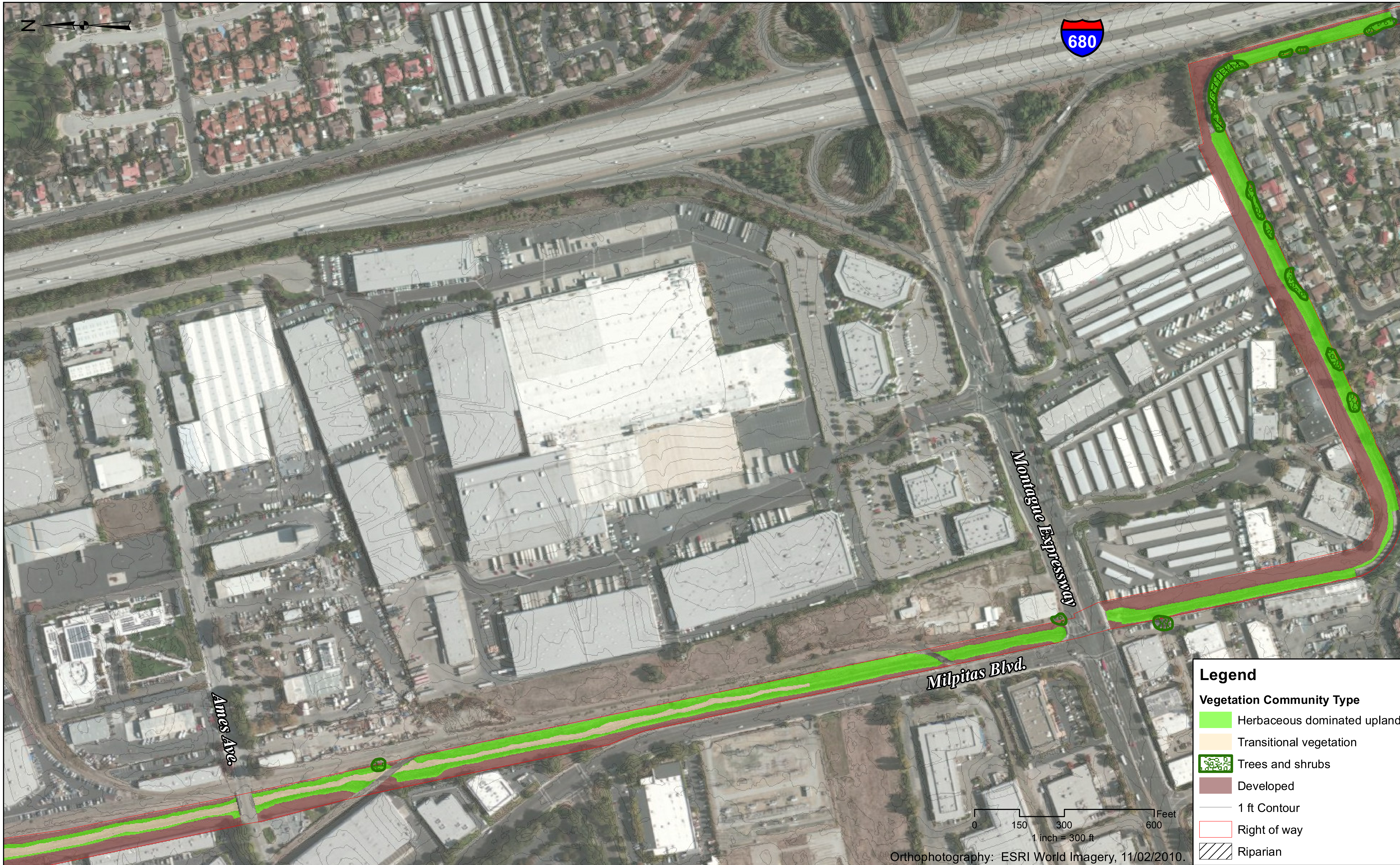

Figure 3.10 Vegetation Types, Upstream Portion of Reach 3 and Reach 4

Tetra Tech
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Irvine, CA 92614
Tel. (949) 809-5000 Fax. (949) 809-5003

Santa Clara Valley Water District

County of Santa Clara, California

UPPER BERRYESSA CREEK FLOOD RISK MANAGEMENT PROJECT

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REACH 1. In-channel vegetation is dominated by non-woody wetland species including tall flatsedge, spotted lady's thumb (*Polygonum persicaria*), willow smartweed (*P. lapathifolium*), American brooklime, barnyard grass (*Echinochloa* sp.), and common cattail (*Typha latifolia*). Aquatic species include Gila River water hyssop (*Bacopa eisenii*) and watercress (*Rorippa nasturtium-aquaticum*). Upslope of the aquatic edge but below the Ordinary High Water Mark (OHWM), vegetation is primarily composed of wild radish (*Raphanus sativus*) and giant horsetail (*Equisetum telmateia*). The surrounding upland community is regularly maintained and dominated by weedy non-woody species such as black mustard (*Brassica nigra*), cheeseweed mallow (*Malva parviflora*), wild oat (*Avena fatua*), ripgut brome (*Bromus diandrus*), rescue grass (*Bromus catharticus*), and tumbleweed (*Amaranthus albus*). The overbank areas are composed of gravel access roads and landscaping or development. Washington fan palms (*Washingtonia robusta*) dominate the landscape areas and a few redwood (*Sequoia sempervirens*)*,* red ironbark eucalyptus (*Eucalyptus sideroxylon*), Italian cypress (*Cupressus sempervirens*), and holly oak *(Quercus ilex)* are present (see Appendix F).

REACH 2. Vegetation in Reach 2 is very similar to Reach 1 except that it is confined to an even narrower channel with steeper stream banks, and has a thinner fringe of transitional vegetation along the creek channel. Although the species assemblage in the fringing wetland is similar to Reach 1, plant densities are lower. One patch of red willow (*Salix laevigata*) saplings is present. Aquatic floating water primrose (*Ludwigia peploides*) is present in a few high density patches near the downstream end of Reach 2. Algae are ubiquitous in areas of open water, likely due to high nutrient levels and temperatures and minimal flow through this reach. An area of planted native trees and shrubs is located on the east top of bank adjacent to the pocket park. The dominant species in this planted area is toyon (*Heteromeles arbutifolia*), with a few white alders (*Alnus rhombifolia*) and crape myrtle (*Lagerstroemia indica*), and Fremont cottonwoods (*Populus fremontii*) present. Patches of Himalayan blackberry (*Rubus armeniacus*) are present in the upland areas. A number of landscape trees/shrubs occur at the edge of the ROW and on adjacent commercial properties within 5 feet of the property line, mostly at the western ROW boundary. These mostly non-native trees/shrubs include blackwood acacia (*Acacia melanoxylon*), Aleppo pines (*Pinus halepensis*), silver dollar gum (*Eucalyptus polyanthemos*), and Chinese photinia (*Photinia sp.).* Four native California nutmeg (*Torreya californica*) and six white alders (*Alnus rhombifolia*) occur in this area (see Appendix F).

REACH 3. Reach 3 is located upstream of the confluence with Piedmont Creek, which supplies surface flow to Upper Berryessa Creek. With the exception of the downstream end of the survey area, and some isolated depressions, surface water was absent in Reach 3 during the survey. The limited moisture reduces the extent of aquatic and transitional vegetation. Where aquatic and transitional vegetation is present, the same species assemblage is present as in Reach 2. Upstream, the dry open channel is very narrow and predominantly unvegetated gravel and cobble are present with sporadically distributed, low-density transitional vegetation. Upland plants extend down the steep, highly incised channel slopes into the active stream channel in some areas. A number of landscape trees/shrubs occur at the edge of the ROW and on adjacent commercial properties within 5 feet of the property line, mostly at the western ROW boundary downstream of Yosemite Drive. Non-natives in this area include London plane trees (*Platanus hybrid*), Aleppo pines (*Pinus halepensis*), and pepper trees (*Schinus sp.*). Five native white alders (*Alnus rhombifolia*) occur in this area. In addition, a few widely scattered native trees are present within the ROW between Yosemite Drive and Montague Expressway. These include several coast live oak (*Quercus agrifolia*), two elderberry (*Sambucus nigra*) and two valley oaks (*Quercus lobata*) (see Appendix F).

Table 3.10 Summary of Vegetation in the Project Area		
Scientific Name	**Common Name**	**Distribution**
Vegetation Community Type: Open water/Aquatic		
Bacopa eisenii	Gila River water hyssop	Dispersed
Ludwigia peploides	Floating water primrose	High density patches
Rorippa nasturtium-aquaticum	Watercress	Dispersed
Transitional		
Conium maculatum	Poison hemlock	Patchy
Cyperus eragrostis	Tall flatsedge	Throughout
Echinochloa sp.	Barnyard grass	Throughout
Epilobium ciliatum	Fringed willowherb	Throughout
Equisetum telmateia	Giant horsetail	Throughout
Foeniculum vulgare	Sweet fennel	Patchy
Juncus xiphioides	Iris leaf rush	Patchy
Lepidium latifolium	Perennial pepperweed	Throughout
Lythrum hyssopifolia	Hyssop loosestrife	Patchy
Oenothera elata	Evening primrose	Patchy
Paspalum distichum	Knot grass	Throughout
Phalaris aquatica	Harding grass	Patchy
Polygonum lapathifolium	Willow smartweed	Throughout
Polygonum persicaria	Spotted lady's thumb	Throughout
Polypogon monspeliensis	Rabbit's foot grass	Throughout
Populus fremontii	Fremont cottonwood	Patchy
Quercus agrifolia	Coast live oak	Patchy
Raphanus sativus	Wild radish	Throughout
Ricinus communis	Castor bean	Patchy
Rubus armeniacus	Himalayan blackberry	Patchy
Rumex conglomeratus	Green dock	Patchy
Salix laevigata	Red willow	Patchy
Schinus molle	Peruvian peppertree	Patchy
Typha latifolia	Common cattail	Patchy
Ulmus sp.	Elm (exotic)	Patchy
Urtica dioica	Hoary nettle	Patchy
Veronica americana	American brooklime	Throughout
Veronica anagallis-aquatica	Water speedwell	Throughout
Xanthium strumarium	Rough cockleburr	Throughout
Herb-dominated Upland and Developed		
Amaranthus albus	Tumbleweed	Patchy
Avena fatua	Wild Oat	Throughout
Brassica nigra	Black mustard	Throughout
Bromus catharticus	Rescue grass	Throughout
Bromus diandrus	Ripgut brome	Throughout
Convolvulus arvense	Field bindweed	Patchy
Conyza canadensis	Horseweed	Patchy
Lactuca serriola	Prickly Wild Lettuce	Throughout
Leymus cinereus	Giant wild rye	Patchy
Lolium multiflorum	Italian rye grass	Throughout
Malva nicaeensis	Bull mallow	Throughout
Malva parviflora	Cheeseweed mallow	Throughout
Sonchus asper	Prickly sow thistle	Throughout
Tragopogon porrifolius	Purple salsify	Patchy

Scientific Name	Common Name	Distribution
Trees and Shrubs		
Pinus halepensis	Aleppo pine	Patchy
Malus sp.	Apple	Patchy
Salix lasiolepis	Arroyo willow	Patchy
Fraxinus sp.	Ash	Patchy
Jacaranda mimosifolia	Black poui	Patchy
Acacia melanoxylon	Blackwood acacia	Patchy
Torreya californica	California nutmeg	Patchy
Pinus canariensis	Canary Island pine	Patchy
Ceratonia siliqua	Carob tree	Patchy
Photinia sp.	Chinese photinia	Patchy
Pistacia chinensis	Chinese pistachio	Patchy
Quercus agrifolia	Coast live oak	Patchy
Baccharis pilularis	Coyote brush	Patchy
Lagerstroemia indica	Crapemyrtle	Patchy
Sambucus nigra	Elderberry	Patchy
Ulmus sp.	Elm	Patchy
Betula pendula	European white birch	Patchy
Populus fremontii	Fremont cottonwood	Patchy
Quercus ilex	Holly oak	Patchy
Casuarina equisetifolia	Horsetail tree	Patchy
Cupressus sempervirens	Italian cypress	Patchy
Myoporum laetum	Lollypop tree	Patchy
Platanus hybrida	London planetree	Patchy
Arctostaphylos sp.	Manzanita	Patchy
Pittosporum tobira	Mock orange	Patchy
Pinus radiata	Monterey pine	Patchy
Olea europaea	Olive	Patchy
Citrus sp.	Orange	Patchy
Prunus sp.	Ornamental plum	Patchy
Schinus sp.	Pepper tree	Patchy
Eucalyptus sideroxylon	Red ironbark	Patchy
Sequoia sempervirens	Redwood	Patchy
Albizia julibrissin	Silk tree	Patchy
Eucalyptus polyanthemos	Silver dollar gum	Patchy
Liquidambar styraciflua	Sweetgum	Patchy
Heteromeles arbutifolia	Toyon	Patchy
Liriodendron tulipifera	Tulip tree	Patchy
Unknown	Unknown dead tree	NA
Pinus sp.	Unknown pine	NA
Rosaceae	Unknown shrub	NA
Quercus lobata	Valley oak	Patchy
Washingtonia robusta	Washington fan palm	Patchy
Juniperus scopulorum	Weeping juniper	Patchy
Alnus rhombifolia	White alder	Patchy

REACH 4. Reach 4 is similar to the dry, upstream portion of Reach 3, and primarily hosts weedy upland species, very few transitional species, and no aquatic species. Trees are present on the edge of the channel in places and include coast live oak (*Quercus agrifolia*), holly oak (*Q. ilex*), Fremont cottonwood (*Populus fremontii*), and elm (*Ulmus* sp.). The majority of the plants present are the same non-woody, weedy upland species observed in all other reaches. No vegetation is present where the channel is

concrete-lined. Native and non-native trees and shrubs are widely scattered within the ROW in this reach, except on the sharp bend downstream of I-680 where a stand of mostly native trees occurs on the west bank. Isolated native arroyo willows (*Salix lasiolepis*), black elderberry (*Sambucus nigra*), coast live oak (*Quercus agrifolia*) and Fremont cottonwoods (*Populus fremontii*), are present north of the bend downstream of I-680. Isolated non-natives in this area are dominated by holly oaks (*Quercus ilex*), with a few Washington fan palms (*Washingtonia robusta*), Chinese photinia (*Photinia sp.)* and pines (*Pinus sp.).* The stand at the bend downstream of I-680 contains 27 trees, consisting of native coast live oaks, Fremont cottonwoods and non-native holly oaks. A line of 17 trees is found at the proposed staging area east of the bend below I-680, consisting of non-native horsetail trees (*Casuarina equisetifolia)* and weeping junipers (*Juniperus scopulorum*) (see Appendix F).

3.5.2.2. *Trees*

A botanical survey that included the project area found that the stream banks between Calaveras Boulevard and Montague Expressway were largely devoid of trees (EDAW 2006). Subsequent field investigations performed in August of 2014 (Tetra Tech 2014) and 2015 (HT Harvey, 2015) found similar conditions, although trees were identified in the overbank areas (beyond the access roads) in all reaches.

A 2008 tree inventory of the channel and overbank areas of Reaches 1–4 identified numerous trees, the largest of which was 30 inches in diameter at breast height (SCVWD 2008). Most trees were non-native or ornamental, although some native species including coastal live oaks and Fremont cottonwoods were identified. Approximately 120 trees were mapped in Reaches 1–3, and approximately 170 in Reach 4. A tree survey of the project area, including the proposed construction staging area and buffer areas within 5 ft of the ROW identified 432 trees and shrubs greater than 2 in diameter at breast height (DBH) within the survey area. Of those 432 trees and shrubs, 145 are native species (HT Harvey, 2015).

In general, trees are not dense enough and do not contain sufficient understory to provide riparian functions. In most cases, they are relatively small and set back well away from the banks; therefore, they do not provide significant shade or cooling effects to water in the stream. The exception to this is found at the upstream end of Reach 4, on the inside of the upstream 90+ degree bend (Figure 3.10). A stand of cottonwoods, coastal live oaks, and non-native holly oaks is present, and as they are found on a small bench below the top of the bank, this is considered riparian habitat and is under the jurisdiction of the California Department of Fish and Wildlife (CDFW) and SFBRWQCB. However, due to its limited area and location on a stretch of stream that is dry for much of the year, this riparian area does not provide cooling effects or other significant riparian functions.

One heritage tree, a valley oak *(Quercus lobata)*, is found within the current footprint of the proposed construction staging area at the UPRR yard, on the right bank downstream of Montague Expressway.

3.5.2.3. *Fish and Wildlife*

The project area provides discontinuous patches of highly disturbed wildlife habitat. The incised channel may provide a low quality corridor between the foothills and San Francisco Bay, as well as narrow refugia from the adjoining urban environment. Wildlife species present in the project area may include those well adapted to human disturbance and urbanized environments. Typical mammals include coyote (*Canis latrans*), raccoon (*Procyon lotor*), opossum (*Didelphia virginiana*), California ground squirrel (*Ostospermophilus beecheyi*), and various microtine rodents such as mice and pocket gophers

(*Thomomys* sp.). Exotic mammals include feral cats (*Felis domesticus*) and rats (*Ratus* sp.). Common bird species include great egret (*Ardea alba*), black-crowned night heron (*Nycticorax nycticorax*), killdeer (*Charadrius vociferus*), mallard duck (*Anas platyrhynchos*), mourning dove (*Zenaida macroura*), black phoebe (*Sayornis nigricans*), song sparrow (*Melospiza melodia*), house finch (*Carpodacus mexicanus*), and western scrub jay (*Aphelocoma californica*). Exotic bird species include house sparrow (*Passer domesticus*) and European starling (*Sturnus vulgaris*). One reptile species, the western fence lizard (*Sceloporus occidentalis*), would be considered common in the project area. Amphibians found in the area may include Pacific treefrog (*Hyla regilla*) and western toad (*Bufo boreas*).

Aquatic conditions within the project area are generally not supportive of fish. Due to high water temperatures, which reach as high as 84.7°F, migratory fish are not expected to occur in the project area, and suitable habitat is only found for mosquitofish *(Gambusia affinis)* and California roach *(Hesperoleucus symmetricus).*

3.5.2.4. *Special Status Species*

Special status species addressed in this section include plants and animals legally protected or otherwise considered sensitive by Federal, State, or local resource conservation agencies and organizations. The following list provides more specific descriptions of the categories for sensitive species and their habitats:

- Plant and wildlife species listed under the California Endangered Species Act (CESA) and/or the Federal Endangered Species Act (ESA) as threatened or endangered;
- Plant and wildlife species that are “candidates for listing” or “proposed for listing” under either the CESA or ESA;
- Species protected by the Federal Migratory Bird Treaty Act (MBTA) (16 USC 703-711), the Federal Bald and Golden Eagle Protection Act (16 USC 668), or California Fish and Game Code 3503.5;
- Wildlife species identified by CDFW as “California Species of Special Concern” because declining population levels, limited ranges, and/or continuing threats have made them vulnerable to extinction; these species receive no formal protection under the California Fish and Wildlife Code; and
- Plants considered by the California Native Plant Society (CNPS) to be “rare,” “threatened,” or “endangered”, all of which are listed under the California Rare Plant Rank of “1B”, or Plants Rare, Threatened, or Endangered in California, and Elsewhere.

Searches of the California Natural Diversity Database (CNDDB) (CDFW 2014), CNPS database, and U.S. Fish and Wildlife Service (USFWS) database were conducted to identify all special status plant and wildlife species that may occur in the project vicinity. The likelihood of occurrence of each species in the proposed project area was determined by assessing historical and current distributions, supporting habitat availability and quality, and by performing field surveys.

3.5.2.5. *Special Status Plants*

Database searches from USFWS and CNDDB (which includes CNPS) identified 13 special status plant species that may occur in the proposed project area quadrangle (i.e., Milpitas [3712148]) (Table 3.11). Of these, three are federally endangered, all are ranked 1B by California Rare Plant Ranks, and none are listed under the CESA. None of these species are likely to occur in the proposed project area due to lack of supporting habitat features (CDFW 2014), and are absent from the Species Occurrence Data provided

by CNDDB for the proposed project area (CDFW 2014). Evidence of these species and their habitat features was not detected during a baseline biological survey that was performed throughout the project area in August 2014. Because the listed special status plant species identified in Table 3.11 are all unlikely to be present, no further analysis is provided.

Table 3.11 Special Status Plants Species Possibly Occurring in the Project Vicinity

Scientific Name	Common Name	Federal/ State/ CNPS	Habitat	Potential of Occurrence
Acanthominta duttonii	San Mateo thornmint	E/-/1B.1	Serpentine, chaparral	Unlikely; no suitable habitat
Astragalus tener var. *tener*	Alkali milk-vetch	-/-/1B.2	Playas, vernal-pools, in and out of wetlands	Unlikely; no suitable habitat
Atriplex depressa	Brittlescale	-/-/1B.2	Playas, in and out of quality wetlands	Unlikely; no suitable habitat
Atriplex joaquinana	San Joaquin spearscale	-/-/1B.2	Meadows, upland only	Unlikely; no suitable habitat
Atriplex minuscula	Lesser saltscale	-/-/1B.1	Non-wetland playas	Unlikely; no suitable habitat
Castilleja affinis ssp. neglecta	Tiburon paintbrush	E/-/1B.2	Serpentine grasslands	Unlikely; no suitable habitat
Ceanothus ferrisae	Coyote ceanothus	E/-/1B.1	Chaparral, coastal scrub	Unlikely; no suitable habitat
Centromadia parryi ssp. *congdonii*	Congdon's tarplant	-/-/1B.1	Valley and foothill grassland (alkaline)	Unlikely; no suitable habitat
Chloropyron maritimum ssp. *palustre*	Point Reyes salty bird's-beak	-/-/1B.2	Coastal salt marshes and swamps	Unlikely; no suitable habitat
Chorizanthe robusta var. *robusta*	Robust spineflower	E/-/1B.1	Sandy or gravelly chaparral (maritime), cismontane woodland (openings), coastal dunes, coastal scrub	Unlikely; no suitable habitat
Cirsium fontinale var. fontinale	Fountain thistle	E/-/1B.1	Serpentine grasslands	Unlikely; no suitable habitat
Dudleya setchellii	Santa Clara Valley dudleya	E/-/1B.1	Serpentine grasslands	Unlikely; no suitable habitat
Eryngium aristulatum var. *hooveri*	Hoover's button-celery	-/-/1B.1	Vernal pools	Unlikely; no suitable habitat
Eriophyllum latilobum	San Mateo woolly sunflower	E/-/1B.1	Serpentine woodlands	Unlikely; no suitable habitat
Hesperolinon congestum	Marin dwarf-flax	T/-/1B.1	Serpentine grasslands	Unlikely; no suitable habitat
Scientific Name	**Common Name**	**Federal/ State/ CNPS**	**Habitat**	**Potential of Occurrence**
Scientific Name	Common		Scientific Name	Common
Holocarpha macradenia	Santa Cruz tarplant	T/-/1B.1	Coastal prairie, coastal scrub	Unlikely; no suitable habitat
Lasthenia conjugens	Contra Costa goldfields	E/-/1B.1	Vernal pools, usually occurs in wetlands, but	Unlikely; no suitable habitat

			occasionally found in non-wetlands	
Malacothamnus hallii	Hall's bush-mallow	-/-/1B.2	Chaparral and coastal scrub	Unlikely; no suitable habitat
Navarretia prostrata	Prostrate vernal pool navarretia	-/-/1B.1	Mesic: coastal scrub, meadows and seeps, valley and foothill grassland (alkaline), vernal pools	Unlikely; no suitable habitat
Suaeda californica	California seablite	E/-/1B.1	Endemic to the coastal zone	Unlikely; no suitable habitat
Trifolium hydrophilum	Saline clover	-/-/1B.2	Marshes and swamps, valley and foothill grassland (mesic, alkaline), vernal pools	Unlikely; no suitable habitat
Sources: CDFW 2014, USFWS 2013 E= Endangered T= Threatened				

3.5.2.6. *Special Status Fish and Wildlife*

Database searches from USFWS and CNDDB (which include State and CDFW listings) identified 15 special status fish and wildlife species that may occur in the proposed project area quadrangle (i.e., Milpitas [3712148]) (Table 3.12). Of these, six are federally threatened or endangered, five are State threatened or endangered, and 14 are CDFW species of special concern or fully protected. In addition, the USFWS stated on December 31, 2014 that a petition from an external party received by USFWS contained substantial information indicating that listing of the Monarch butterfly may be warranted. USFWS is conducting a status review for the monarch butterfly.

Supporting habitat features for most of these species were not identified in the proposed project area, and the Coordination Act Report confirmed that they would not be affected by the proposed project (USFWS 2013). These species are absent from the Species Occurrence Data provided by CNDDB for the proposed project area (CDFW 2014), and evidence of their presence or necessary habitat features was not detected during a baseline biological survey conducted in August 2014 (Tetra Tech 2014). Although there is little potential of occurrence for these species, some may occasionally move through in search of higher quality habitat but would not likely remain for an extended period of time. Known occurrences and supporting habitat have been identified in the surrounding area (CDFW 2014), including downstream of I-880 and upstream of I-680, but not in the project area. Listed and special status fish and wildlife species that were identified as possibly occurring in the project area are identified in Table 3.12.

Table 3.12 Special Status Fish and Wildlife Species Possibly Occurring in the Project Vicinity				
Scientific Name	**Common Name**	**Federal ESA/State ESA/CDFW**	**Habitat**	**Potential of Occurrence**
Invertebrates				
Branchinecta conservatio	Conservancy fairy shrimp	E/-/-	Vernal pools	**Unlikely**; no suitable habitat
Branchinecta lynchi	Vernal pool fairy shrimp	T/-/-	Vernal pools	**Unlikely**; no suitable habitat
Desmocerus californicus dimorphus	Valley elderberry longhorn beetle	T/-/-	Elderberry thickets	**Unlikely**; no suitable habitat
Euphydryas editha bayensis	Bay checkerspot butterfly	T/-/-	Coastal scrub and grasslands	**Unlikely**; no suitable habitat
Lepidurus packardi	Vernal pool tadpole shrimp	E/-/-	Occur in vernal pools	**Unlikely**; no suitable habitat
Fish				
Acipenser medirostris	Green sturgeon	T/-/SC	Bays and estuaries	**Unlikely**; no suitable habitat
Eucyclogobius newberryi	Tidewater goby	E/-/SC	Tidal estuaries	**Unlikely**; no suitable habitat
Hypomesus transpacificus	Delta smelt	T/E/-	Low salinity, turbid, tidal environments	**Unlikely**; no suitable habitat
Oncorhynchus kisutch	Coho salmon - central CA coast	Endangered	Central California coastal rivers	**Unlikely**; no suitable habitat
Oncorhynchus mykiss	Central California Coastal steelhead	T/-/-	Drainages of San Francisco and San Pablo bays, central California coastal rivers	**Unlikely**; no suitable habitat
Oncorhynchus tshawytscha	Central Valley spring-run chinook salmon	T/T/-	Drainages of San Francisco and San Pablo bays, central California coastal rivers	**Unlikely**; no suitable habitat
Spirinchus thaleichthys	Longfin smelt	C/T/SC	Wide range of temperature and salinity conditions in coastal waters near shore, bays, estuaries, and rivers	**Unlikely**; no suitable habitat
Amphibians				
Ambystoma californiense	California tiger salamander	T/T/SC	Ponds, streams, drainages, and associated uplands	**Unlikely**; no suitable habitat
Rana draytonii	California red-legged frog	T/-/SC	Dense, shrubby, or emergent riparian vegetation and aquatic habitat	**Unlikely**; no suitable habitat
Reptile				
Emys marmorata	Western pond turtle	-/-/SC	Shallow, flowing streams, with some cobble-sized substrate	**Unlikely**; no suitable habitat
Gambelia (=Crotaphytus) si/a	Blunt-nosed leopard lizard	E/E/FP	Valley grasslands and alkali scrublands	**Unlikely**; no suitable habitat
Masticophis lateralis euryxanthus	Alameda whipsnake [=striped racer]	T/T/-	Coastal scrub and chaparral communities	**Unlikely**; no suitable habitat
Thamnophis gigas	Giant garter snake	T/T/-	Marshes, lake edges, flooded fields	**Unlikely**; no suitable habitat
Thamnophis sirtalis tetrataenia	San Francisco garter snake	E/E/FP	Coastal marsh habitats	**Unlikely**; no suitable habitat
Birds				
Brachyramphus marmoratus	Marbled murrelet	T/E/-	Offshore pelagic areas, old growth coniferous forest	**Unlikely**; no suitable habitat

Scientific Name	Common Name	Federal ESA/State ESA/CDFW	Habitat	Potential of Occurrence
Charadrius alexandrinus nivosus	Western snowy plover	T/-/SC	Nest near tidal waters, forages in sandy coastal beaches, salt ponds and gravel bars	**Unlikely**; no suitable habitat
Rallus longirostris obsoletus	Ridgway's clapper rail	E/E/FP	Requires saltwater marshes with tidal sloughs and forages in tidal mud flats. Usually associated with pickleweed	**Unlikely**; no suitable habitat
Agelaius tricolor	Tricolored blackbird	-/-/SC	Colonial nester in emergent freshwater marshes; heavy cattail, tule growth	**Unlikely**; no suitable habitat
Geothlypis trichas sinuosa	Saltmarsh common yellowthroat	-/-/SC	Salt marshes	**Unlikely;** no suitable habitat
Melospiza melodia pusillula	Alameda song sparrow	-/-/SC	Tidal marshes along the fringes of south San Francisco Bay	**Unlikely;** no suitable habitat
Athene cunicularia	Burrowing owl	-/-/SC	Open, dry annual or perennial grassland, deserts and scrublands characterized by low-growing vegetation, subterranean nester in small mammal burrows	**Possible but Unlikely;** very limited, poor quality habitat
Elanus leucurus	White-tailed kite	-/-/FP	Large areas of open grasslands, meadows, marshes, dense-topped trees for resting	**Unlikely;** no suitable habitat
Pelecanus occidentalis californicus	California brown pelican	D/D/FP	Marine environments, bays and estuaries	**Unlikely**; no suitable habitat
Sternula antillarum (=Sterna, =albifrons) browni	California least tern	E/E/FP	Open, gravelly fields near estuaries, lakes, or rivers	**Unlikely**; no suitable habitat
Vireo belii pusillus	Least Bell's vireo	E/E/FP	Riparian forest with dense understory	**Unlikely**; no suitable habitat
Mammals				
Corynorhinus townsendii	Townsend's big-eared bat	-/C/SC	Roosts in caves, old building, and occasionally under abandoned bridges; forages in edge habitats along streams and areas adjacent to and within a variety of woodland habitats	**Possible but Unlikely;** only very low quality habitat present and extensive human disturbance.
Reithrodontomys raviventris	Salt-marsh harvest mouse	E/E/FP	Breeds and forages primarily in pickleweed marshes; uses adjacent upland areas with tall vegetation for cover	**Unlikely**; no suitable habitat
Sorex vagrans halicoetes	Salt-marsh wandering shrew	-/-/SC	Inhabit a narrow band of pickleweed marsh that is tidally inundated daily	**Unlikely**; no suitable habitat
Vulpes macrotis mutica	San Joaquin kit fox	E/T/-	Oak savannah, open grasslands	**Unlikely**; no suitable habitat
Sources: CDFW 2014, USFWS 2013 E= Endangered, T=Threatened, D=Delisted, FP=Fully Protected, SC=Species of Special Concern				

Of the species identified in Table 3.12, possible habitat occurs only for the burrowing owl and Townsend's big-eared bat, as described below. Therefore, no further analysis is provided for the other species.

BURROWING OWL. The burrowing owl (*Athene cunicularia*) is primarily a grassland species, but it persists in some landscapes highly altered by human activity. The overriding characteristics of suitable habitat appear to be burrows for roosting and nesting and relatively short vegetation with only sparse shrubs and taller vegetation. In urban areas, burrowing owls persist in low numbers on highly developed parcels such as airfields, in busy urban parks, and adjacent to roads with heavy traffic. Nest and roost burrows of this species in California are most commonly dug by ground squirrels (*Spermophilus beecheyi*), but they may also use badger (*Taxidea taxus*), coyote (*Canis latrans*), and fox (*Vulpes* sp.) holes. Their diet includes a broad array of arthropods (centipedes, spiders, beetles, crickets, and grasshoppers), small rodents, birds, amphibians, reptiles, and carrion. Because of their need for open habitat with low vegetation, burrowing owls are unlikely to persist in urban environments with higher densities of development. Also, developed environments pose a substantial risk to burrowing owls primarily due to mortality from collisions with vehicles. Little habitat exists that would support burrowing owls in the study area and no sign of this species was observed during the wildlife field survey, making it unlikely that they are present.

TOWNSEND'S BIG-EARED BAT. The only special status mammal for which habitat occurs in the project area is the Townsend's big-eared bat *(Corynorhinus townsendii)*. This species may occur in old mines, abandoned buildings, or old bridges that contain crevices or other contours in which bats may roost. A bat survey performed in the project area in 2005 (HT Harvey 2005) found no bats or signs of bats, and also found that almost all bridges had flat bottoms, which provide no crevices for roosting habitat. The UPRR railroad trestle was found to offer day roosting habitat where spaces occurred between the timbers of the bridge, but no evidence of the presence of bats was detected. This species is very sensitive to human disruption and is considered unlikely to occur in the study area.

3.5.2.7. *Wetlands and Waters of the U.S.*

Waters of the U.S., as defined under the Federal Clean Water Act, are found in Upper Berryessa Creek within the project area (Tetra Tech 2015b). Formal Wetlands/Waters of the U.S. delineations were performed in 2005 and 2014 to locate and quantify these resources. Spatial dimensions of these features are presented in Table 3.13, below, and are presented on maps in Appendix C. The 2014 delineation did not map fringing wetlands separately from Other Waters of the U.S., due to their small size and patchy distribution, location below OHWM, lack of hydric soils, and minimal ecological influence on the primarily riverine system. is the 2014 delineation estimated that less than 0.5 acre of patchy fringe aquatic habitat is present within the area of Other Waters of the U.S., and is present mostly north of the confluence of Piedmont Creek and Upper Berryessa Creek (around the upstream extent of surface water). The wetland delineation prepared by USFWS in 2005 identified 0.39 acre of jurisdictional wetlands in this reach (USFWS 2005). The amount of wetland vegetation and its exact location within the creek channel varies from season to season and year to year depending on water conditions and the amount of bed and bank erosion. The 2014 survey did not include a detailed mapping of vegetated other waters of the U.S.; instead the 2014 survey estimated vegetated other waters of the U.S. (i.e. fringing wetlands) occurring in the project area at less than 0.5 acre. The 2014 estimate is reasonably consistent with the 0.39 acre of vegetated other waters of the U.S. found in the 2005 delineation. Differences between the 2005 and 2014 surveys are due to seasonal and year to year variations in the extent of vegetative growth.

Table 3.13 Summary of Waters of the U.S./State and Vegetated Other Waters of the U.S. and State within the Project Area*				
Waters or Wetland	**Location**	**Description**	**Acres, Reaches 1-3**	**Acres, Reach 4**
Waters of the U.S. /State	Berryessa Creek Upstream of Calaveras Blvd. and Los Coches and Piedmont Creeks near confluences with Berryessa Creek	Intermittent Stream	3.06 / 3.06	1.12/ 1.12
Vegetated other waters of the U.S. and other waters of the State (i.e. fringing wetlands)**	Lower Piedmont Creek, and Berryessa Creek north of Ames Avenue	Riverine: Occasionally Flooded, Floodplain, herb-dominated [1]	< 0.5	0
[1]Cowardin 1979 *Based on Tetra Tech 2015a. A previous wetland delineation prepared by the USFWS identified 0.39 acre of jurisdictional wetlands. **These other waters are also included in Waters of the U.S./State.				

According to the USACE manual and implementing guidance, there must be positive indicators of each parameter (hydrophytic vegetation, hydrology, and hydric soils) present to make a wetland determination. The less than 0.5 acre of fringing wetlands lack the hydric soils criteria and do not qualify as federal jurisdictional wetlands. They consist of wetland vegetation growing within other waters of the U.S. The fringing wetlands are located within waters of the State.

Functionally, the survey area exhibited distinct elements of a riverine system, and the fringing aquatic vegetation present was small, patchy, and located within the boundaries of the OHWM. Evidence suggests the system is highly dynamic due to the flashy flows it receives during the wet season, and because of maintenance activities, which combine to alter vegetation and soils (when maintenance requires erosion control or other earthwork) on a regular basis. The engineered structure of the channel further prevents the development of wetland features, due to the system being designed to efficiently move storm flows.

3.5.2.8. *Waters of the State of California*

Waters of the State as regulated by RWQCB generally correspond to Waters of the U.S. As described in Section 3.5.2.7, fringing wetlands were identified in Reaches 1–3, downstream of Ames Avenue. As reported above, because most areas lacked at least one of three wetland indicators but exhibited clear indicators of OHWM, the majority of Upper Berryessa Creek was delineated as Other Waters of the State (Tetra Tech 2015b). Waters of the State within the project area includes 4.18 acres that were also identified as Waters of the U.S.

3.5.2.9. *Sensitive Natural Communities*

CDFW and other agencies designate areas with important functions or values, those that are clearly declining in extent or distribution, or those that are threatened as sensitive natural communities. Sensitive natural communities include shaded riparian aquatic, oak woodlands, riparian areas, wetlands, or fescue (bunchgrass) grasslands. If present, these communities are reported by the CNDDB. The CNDDB does not list any sensitive natural communities in the area. Other than wetlands, which are covered in Section 3.5.2.7, the only other sensitive natural community is a small stand of riparian forest

located in the upstream part of Reach 4. This forest includes native and non-native trees, primarily Fremont cottonwood, coast live oak, and holly oak, and covers 0.18 acre.

3.5.3. Regulatory Setting

3.5.3.1. *Federal Regulations*

FEDERAL CLEAN WATER ACT (CWA)/CALIFORNIA PORTER-COLOGNE ACT. The CWA has provisions for protecting biological resources within the aquatic environment through identification of beneficial uses and regulation of discharges of dredge/fill material into waters of the U.S. Section 404 of the Clean Water Act requires the USACE regulatory section to issue Section 404 permits for discharges of dredged or fill material into waters of the U.S. Although the USACE does not process and issue Section 404 permits for its own activities (such as construction of the proposed project), it authorizes its own discharges by applying all substantive legal requirements and by conducting a Section 404(b)(1) Guidelines analysis. 33 CFR 336.1(a). Under the Section 404(b)(1) Guidelines, a proposed discharge is not allowed if there is a less environmentally damaging practicable alternative that would have less effect on the aquatic ecosystem, and not have other significant adverse environmental impacts (40 CFR 230 et seq).

USACE regulations generally require USACE to seek Section 401 water quality certification for USACE projects involving a discharge into waters of the U.S. even though USACE does not issue itself a Section 404 permit. However, the proposed project, as a project authorized by Congress that has completed an EIS, qualifies for exemption under 33 U.S. Code 1344(r).

ENDANGERED SPECIES ACT. The USFWS and National Marine Fisheries Service (NMFS) have jurisdiction over species listed as threatened or endangered under the Federal Endangered Species Act of 1973, as amended and candidate species proposed for listing. The ESA protects listed species from harm, or "take," which is broadly defined as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." For any project with a Federal nexus that affects a listed species, the Federal agency must consult with the USFWS and/or NMFS Fisheries under Section 7 of the ESA. For projects without a Federal nexus, the lead agency must consult with USFWS and/or NMFS under Section 10 of the ESA. Under the ESA, critical habitat may be formally designated by the USFWS or NMFS for survival and recovery of listed species. Critical habitat designations are specific areas within a geographic region that are occupied by a species and determined to be critical to its survival in accordance with the ESA. The project area does not include designated critical habitat for any ESA-listed species.

FISH AND WILDLIFE COORDINATION ACT. The Fish and Wildlife Coordination Act (FWCA) of 1958, as amended ensures that fish and wildlife receive consideration equal to that of other project features for projects that are constructed, licensed, or permitted by Federal agencies. The FWCA requires that the views of USFWS, NMFS, and the applicable State fish and wildlife agency (in this case CDFW) be considered when impacts are evaluated and mitigation needs determined.

The USACE requested coordination with USFWS under the FWCA, and a Coordination Act Report was issued in April of 2014 (USFWS 2013). USFWS summarized the USACE's finding that: (1) the project area has poor to non-existent wildlife habitat due to channelization and vegetation removal; (2) the only fish species that may occur include mosquitofish and the California roach, both of which are adapted for life

in shallow, warm, stagnant water, and which are likely only to occur between Calaveras and Piedmont Creek where there are constant flows; and (3) that there is no habitat for State or Federal listed species.

The CAR recognized two fish and wildlife habitat types that may be affected by the proposed project, including emergent wetland and annual grassland. USFWS recommends that the project sponsors minimize loss of annual grassland habitat, which they ranked as “Resource Category 4” due to its low value, and ensure that the project results in no net loss of emergent wetlands, which they ranked as a “Resource Category 2” due to their relative scarcity. The USFWS also recommended that the USACE:

- Avoid impacts to native trees, shrubs, and aquatic vegetation within and adjacent to the site to the extent possible. If native trees or shrubs with a diameter at breast height (dbh) of 2 inches or greater is encountered and cannot be avoided, it should be replaced in-kind so that the combined diameter of the container plantings is equal to the combined diameter of the trees removed.
- Avoid impacts at the site by ensuring that any fill material used for construction is free of contaminants.
- Avoid impacts to migratory birds nesting in trees along the access routes and adjacent to the proposed sites by conducting preconstruction surveys for active nests along proposed haul roads, staging areas, and construction sites. This would be especially important if construction begins in spring. Work activity around active nests should be avoided until the young have fledged.
- Minimize impacts by reseeding all disturbed areas at the completion of construction with native forbs and grasses.
- Minimize impacts of removal and/or trimming any trees and shrubs by having these activities supervised or completed by a certified arborist.
- Implement as described all mitigation measures in Chapter 5 of the March 2013 Draft GRR/EIS.
- Continue to work with the Service and other resource agencies to quantify project effects and determine mitigation needs as modifications to the proposed project develop.

MIGRATORY BIRD TREATY ACT. The MBTA of 1918 implements a series of international treaties that provide for migratory bird protection. The MBTA authorizes the Secretary of the Interior to regulate the taking of migratory birds. The act provides that it shall be unlawful, except as permitted by regulations, “to pursue, take, or kill any migratory bird, or any part, nest or egg of any such bird…” (16 USC 703). This prohibition includes both direct and indirect acts, although harassment and habitat modification are not included unless they result in direct loss of birds, nests, or eggs. The current list of species protected by the MBTA includes several hundred species and essentially includes all native birds. Permits for take of non-game migratory birds can be issued only for specific activities, such as scientific collecting, rehabilitation, propagation, education, taxidermy, and protection of human health, safety, and personal property.

BALD AND GOLDEN EAGLE PROTECTION ACT. The Bald and Golden Eagle Protection Act (16 USC 668-668c) prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald or golden eagles, including their parts, nests, or eggs. The Act provides criminal penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle ... [or any golden eagle], alive or dead, or any part, nest, or egg thereof." The Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb."

3.5.3.2. *State Regulations*

CALIFORNIA ENDANGERED SPECIES ACT. Pursuant to CESA, a permit from CDFW is required for projects that could result in the "take" of a plant or animal species that is State-listed as threatened or endangered. Under CESA, "take" is defined as an activity that would directly or indirectly kill an individual of a species. The CESA definition of take does not include "harming" or "harassing," as the Federal ESA definition does. Therefore, the threshold for take is higher under CESA than under ESA. A State or local public agency reviewing a proposed project within its jurisdiction must determine whether any State-listed endangered or threatened species may be present in the program area and determine whether the project would have a significant impact on such species. In addition, CDFW encourages informal consultation on any proposed project that could affect a candidate species. For the potential taking of individual animals listed under CESA, Fish and Game Code Sections 2080.1 and 2081 provide for issuance of an incidental take permit. CDFW will issue an incidental take permit only if: (1) the authorized take is incidental to an otherwise lawful activity; (2) the impacts of the authorized take are minimized and fully mitigated; and (3) adequate funding is provided to implement the minimization and mitigation measures.

PORTER-COLOGNE WATER QUALITY CONTROL ACT. Under the Porter-Cologne Water Quality Control Act, all waters of the U.S. that are within the borders of California are also waters of the state, which also include additional waters not regulated by the Clean Water Act. The SWRCB has jurisdiction to require Waste Discharge Requirements (WDRs) for discharges of dredged or fill material into waters of the state. It is currently developing a "Wetland Area Protection and Dredge and Fill Permitting Policy" to guide issuance of such WDRs (SWRCB 2015).

CALIFORNIA FISH AND GAME CODE SECTIONS 1600-1616. Under Sections 1600-1616, CDFW regulates all diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream or lake, which support fish or wildlife (i.e., bed to bank). The CDFW defines a "stream" (including creeks and rivers) as "a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life. This includes watercourses having surface or subsurface flow that supports or has supported riparian vegetation." The CDFW has interpreted the term "streambed" to encompass all portions of the bed, banks, and channel of any stream, including intermittent and ephemeral streams, extending laterally to the upland edge of riparian vegetation.

CALIFORNIA FISH AND GAME CODE SECTIONS 3503 AND 3503.5 PROTECTION OF BIRD NESTS AND RAPTORS. Section 3503 of the California Fish and Game Code states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Section 3503.5 specifically states that it is unlawful to take, possess, or destroy any raptors (i.e., species in the orders falconiformes and strigiformes), including their nests or eggs. Typical violations of these codes include destruction of active nests resulting from removal of vegetation in which the nests are located. Violation of Section 3503.5 could also include failure of active raptor nests resulting from disturbance of nesting pairs by nearby project construction. This statute does not provide for the issuance of any type of incidental take permit.

CALIFORNIA FISH AND GAME CODE FULLY PROTECTED SPECIES. Protection of fully protected species is described in Sections 3511, 4700, 5050, and 5515 of the California Fish and Wildlife Code. These statutes prohibit take or possession of fully protected species and do not provide for authorization of incidental take of fully protected species.

3.5.3.3. *Local Plans and Policies*

Natural resource conservation policies are provided under the Santa Clara County General Plan (Santa Clara County 1994), the City of San Jose General Plan (2011), and the City of Milpitas General Plan (City of Milpitas 2002). These policies contain measures to protect and restore habitat quality, biodiversity, watershed functions, water quality, heritage trees, soils, sensitive species, and open space. These measures provide guidance for planning land uses, recreation, water treatment, point and non-point source pollution control, and use of pesticides and herbicides, amongst other topics.

CITY OF MILPITAS CODE OF ORDINANCES. The Tree Maintenance and Protection Ordinance of the City of Milpitas regulates the removal of trees that contribute significantly to the value of land, preservation of resources, and quality of life in the City of Milpitas (City of Milpitas Municipal Code, Chapter 2, X-2-1.01 to X-2-13.02). The ordinance provides protection to trees that are 56-in diameter or more at breast height (dbh or 4.5 ft above ground level), trees in residential neighborhoods or trees that are 37-in or more dbh in commercial, industrial, or underdeveloped or vacant land. The City of Milpitas Tree Maintenance and Protection Ordinance requires a permit of anyone proposing to remove trees within the City limits that meet the following criteria:

- All trees (including non-natives) which have a 56-inch or greater circumference of any trunk measured 4.5 feet from the ground and located on developed residential property;
- All trees which have a 37-inch or greater circumference of any trunk measured 4.5 feet from the ground and located on developed commercial or industrial property;
- All trees which have a 37-inch or greater circumference of any trunk measured 4.5 feet from the ground, when removal relates to any transaction for which zoning approval or subdivision approval is required; also any tree existing at the time of a zoning or subdivision approval which was a specific subject of such approval or otherwise covered by previously mentioned provisions;
- All trees which have a 37-inch or greater circumference of any trunk measured 4.5 feet from the ground and located on a vacant, undeveloped or underdeveloped property; and
- All heritage trees or groves of trees.

Trees that fall under the protection of this ordinance require replacement or compensation under Section 9 of the code (X-2-9.01). A permit for removal must be obtained by the Public Works Department prior to removal (X-2-4.01). However, the City may remove any trees or other plantings that constitute a hazard or may endanger public health, safety or property, or which constitute an obstruction to the vision of traffic (X-2-5.01-1).

A tree or grove of trees may be designated as a heritage tree or heritage tree grove upon a finding that it is unique and of importance to the community due to any of the following factors: (1) it is an outstanding specimen or grove of a desirable species; (2) it is one of the largest or oldest trees or grove of trees in Milpitas; and/or (3) the tree or grove of trees possesses distinctive form, size, age, location, and/or historical significance.

For trees requiring a permit to remove, the City of Milpitas Public Works Department may require replacement by the permittee through the compensation methods described in the ordinance. These involve reimbursing the City for the costs of removing and replacing the trees or the value of the removed trees. However, USACE, the federal agency constructing the proposed project, is not subject to the procedural requirements of the Milpitas Tree Maintenance and Protection Ordinance.

ENVISION SAN JOSE 2040 GENERAL PLAN. The Community Forest Element contains goals to protect trees and the aesthetic, biological, and cultural functions they provide. Goal MS-21 specifies numerous measures and actions that outline San Jose's strategy to preserve trees, and to replace those that are affected during construction.

CITY OF SAN JOSE TREE ORDINANCE. City ordinance requires a permit to remove a tree greater than 56 inches in circumference (approximately equal to 18 inches in diameter) at two feet above ground level if it is located on private property or along a public street. The ordinance does not apply to trees located on public property. The City has also designated over 100 trees located throughout the City as heritage trees due to their size, history, unusual species, or unique qualities.

SANTA CLARA VALLEY HABITAT CONSERVATION PLAN. The proposed project is not subject to the Santa Clara Valley Habitat Conservation Plan (HCP) because the HCP exempts projects led by the USACE from the plan; however, information on the HCP is provided for informational purposes. The upstream portion of Reach 4 is within the City of San Jose and is within the plan area of the Santa Clara Valley HCP (Santa Clara Valley Habitat Agency, August 2012). The HCP is a 50-year conservation plan designed to protect and conserve habitat for a number of State and Federally-listed special status species. The plan has been approved by the USFWS in conformance with the ESA, the CDFW in conformance with the California ESA, and the USACE in conformance with the Clean Water Act. The HCP includes modeling of habitat for special status species, including plants, mammals, reptiles, amphibians, birds, and insects. The portion of the project area within the HCP area is not modeled as habitat for any of the special status species addressed by the plan. The project area is within the conservation zone for burrowing owl (*Athene cunicularia hypugaea*), but does not contain occupied or overwintering habitat for the burrowing owl. The burrowing owl is a protected species under the Federal Migratory Bird Treaty Act and a California Species of Special Concern.

3.5.4. Significance Criteria

The proposed project would result in a significant impact related to biological resources if it would:

- **BIO-1** Have a substantial adverse effect, either directly or through habitat modification, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS;
- **BIO-2** Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFW, SFBRWQCB, or USFWS, or on healthy stands of trees and/or shrubs;
- **BIO-3** Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the CWA (including, but not limited to, marsh, vernal pool, and coastal) through direct removal, filling, hydrological interruption, or other means;
- **BIO-4** Interfere substantially with the movement of any native resident or migratory fish or wildlife species, or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;
- **BIO-5** Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or
- **BIO-6** Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State Habitat Conservation Plan.

3.5.5. **Potential Impacts**

3.5.5.1. *Significance Criteria with Potential Impacts*

BIO-1 HAVE A SUBSTANTIAL ADVERSE EFFECT, EITHER DIRECTLY OR THROUGH HABITAT MODIFICATION, ON ANY SPECIES IDENTIFIED AS CANDIDATE, SENSITIVE, OR SPECIAL STATUS SPECIES IN LOCAL OR REGIONAL PLANS, POLICIES, OR REGULATIONS, OR BY THE CDFW, OR USFWS

Less than significant for construction; less than significant for operations

CONSTRUCTION (REACHES 1–3). The project area is highly disturbed and habitat complexity is minimal. Ongoing disturbances in the form of noise, traffic, maintenance actions, and human presence diminish the potential that the project area would host special status species. As determined in the Coordination Act Report (USFWS 2013) prepared for the USACE during preparation of the GRR-EIS (USACE 2014), the project area offers little to no habitat for listed species.

Possible aquatic habitat for the western pond turtle *(Clemmys marmorata)* was identified below Los Coches Street during preparation of the Berryessa Creek Project GRR/EIS (USACE 2014). However, other habitat components including upland ovipositing sites and rocks and logs for basking and haul-out sites do not occur in the project area. The potential for occurrence of this species in the project area, as well as impacts to this species, is considered to be very low.

The Berryessa Creek Project GRR/EIS also identified possible impacts to western big-eared bats during modification of bridges and culverts. There will be no modification of bridges under the proposed project, and a survey of the project area found only marginal day roosting habitat at the UPRR rail bridge downstream of Montague Expressway (H.T. Harvey, 2005). The survey also concluded that bats are not expected to roost at this crossing due to its low height. Although bats may forage in the project area, they are considered unlikely to roost or breed in the project area, and the potential for impacts is less than significant.

Based on the above analysis, construction impacts to special status species in Reaches 1 to 3 would be less than significant.

CONSTRUCTION (REACH 4). Part of Reach 4 is within the Valley HCP conservation zone for burrowing owl, but does not contain occupied or overwintering habitat for the burrowing owl (Santa Clara Valley Habitat Agency, 2012). The burrowing owl is a protected species under the Federal Migratory Bird Treaty Act and a California Species of Special Concern. Since no habitat would be affected, no impacts to the burrowing owl would result.

Based on the above analysis, construction impacts to special status species in Reach 4 would be less than significant.

OPERATIONS (ALL REACHES). Most future maintenance activities at the project area would occur under the District's ongoing and permitted SMP2 program, and would not occur as a result of the proposed project. The only operation and maintenance activities that would result from the project are periodic inspections of floodwalls. No impacts to special status species would result.

BIO-2 HAVE A SUBSTANTIAL ADVERSE ~~AND UNMITIGATED~~ EFFECT ON ANY RIPARIAN HABITAT OR OTHER SENSITIVE NATURAL COMMUNITY IDENTIFIED IN LOCAL OR REGIONAL PLANS, POLICIES, REGULATIONS, OR BY THE CDFW, OR USFWS, OR ON HEALTHY STANDS OF TREES AND SHRUBS

Less than significant with mitigation for construction; less than significant for operations

And,

BIO-3 HAVE A SUBSTANTIAL ADVERSE ~~AND UNMITIGATED~~ EFFECT ON FEDERALLY-PROTECTED WETLANDS AS DEFINED BY SECTION 404 OF THE CWA (INCLUDING, BUT NOT LIMITED TO, MARSH, VERNAL POOL, COASTAL, ETC.) THROUGH DIRECT REMOVAL, FILLING, HYDROLOGICAL INTERRUPTION, OR OTHER MEANS

Less than significant for construction; less than significant for operations

CONSTRUCTION (REACHES 1–3)~~.~~

Other than areas of wetlands vegetation and riparian habitat, Reaches 1-3 do not contain any sensitive natural communities that would be affected by the proposed project. The proposed project would affect approximately 5 acres of annual grassland habitat and small areas of in-channel vegetation and top of banks trees and shrubs found in Reaches 1–3. This impact is less than significant because annual grassland and scattered trees and shrubs are not a sensitive natural community and provide minimal habitat value. Nonetheless, USFWS recommended that impacts to annual grassland habitat be minimized because it provides foraging habitat for raptors. USFWS also found that the project would result in no net loss of emergent wetlands vegetation (USFWS, 2013).

Under the proposed project, 3.06 acres of Waters of the U.S. / State would be temporarily removed during the construction period. This area includes less than 0.5 acre of fringing, non-jurisdictional wetlands vegetation found between Ames Avenue and Calaveras Boulevard. The entire area of Waters of the U.S. / State, including the fringing wetland vegetation, would be affected by excavation during construction, and wetland vegetation would be removed and either composted or disposed of offsite. This type of effect was assessed in District studies that found that wetland vegetation quickly re-establishes following sediment removal projects. The “Instream Wetland Vegetation Regrowth Study” performed by Rankin and Hillman and described in SCVWD, 2001, found 65 percent and 98 percent average regrowth within one and two years, respectively, after 1997 sediment removal at six non-tidal freshwater study sites. The study also found that vegetation dominance and quality, as represented by vegetation type, total percent cover of vegetation, and relative percent cover of native and invasive species, were similar between pre-and post-project years. It is anticipated that wetland and transitional vegetation would respond similarly and regenerate naturally over the course of the first two growing seasons, and since the bottom width of the stream channel would be wider than under existing conditions, additional areas of wetland plant communities are likely to form. Additionally, the project sponsors would spread native wetlands seeds in the channel bed at the conclusion of construction to promote accelerated re-growth of native wetlands vegetation. Because wetland vegetation would regrow after construction is complete and the area of wetlands vegetation would increase when compared to the existing condition, this impact would be less than significant.

Concrete would be used to replace existing hardscape beneath and upstream of all bridges and culverts downstream of Montague Expressway, to replace the UPRR trestle, and to form floodwalls. Rock revetment would primarily be used around stormwater outfalls. In general, these materials would be used to replace similar materials that currently exist. Table 3.14 indicates the amount of concrete or exposed revetments that would occur in Reaches 1–3 under pre- and post-project conditions. As shown in Table 3.14, the proposed project would result in a net increase of 0.43 acre of hardscape (i.e. concrete

lining and rock revetment) below OHWM. This increased hardscape would be within waters of the U.S. and of the State. In addition, the proposed project would result in a decrease in hardscape of 0.15 acre above OHWM. The total increase in hardscape in Reaches 1 through 3 would be 0.28 acre. The proposed project would widen the channel, increasing the amount of area below OHWM (and thus waters of the U.S. and of the State) by 2.0 acres. The permanent impact on jurisdictional waters would be less than significant.

The proposed project would remove 45 native trees and shrubs with dbh of 2 inches or greater in Reaches 1 through 3. These trees include 1 redwood, 4 California nutmeg, 8 coast live oak, 2 Fremont cottonwood, 20 toyon, 6 white alders, 1 coyote brush, ~~1~~ 2 elderberry, and 1 valley oak. The trees/shrubs to be removed include 26 native trees/shrub in the vicinity of the exercise equipment and recreational trail located upstream on the east bank of Berryessa Creek upstream of the Los Coches Creek confluence. These trees/shrubs extend from the creek channel and provide connectivity between the channel and riparian habitat at the top of bank. Removal of this healthy stand of native trees/shrubs would be a significant impact.

Table 3.14 Amount of Exposed Hardscape Materials (Reaches 1–3) *

Type of Material	Pre-Construction (square feet/acres)	Post-Construction (square feet/acres)	Amount of Change (square feet/acres)
Concrete Below OHWM	9,837/0.23	26,242/0.60	+16,405/0.38
Concrete Above OHWM	18,092/0.42	9,118/0.21	-8,974/-0.20
Rock Revetment Below OHWM	3,168/0.07	5,416/0.12	+2,248/0.05
Rock Revetment Above OHWM	427/0.01	2,710/0.06	+2,283/0.05
Concrete Sandbag Below OHWM	144/0.003	0/0	-144/0.003
Concrete Sandbag Above OHWM	757/0.017	0/0	-757/-0.017
*Source: Tetra Tech 2015e.			

CONSTRUCTION (REACH 4). Reach 4 contains 1.12 acres of Waters of the U.S. and 1.30 acres of Waters of the State (including 0.18 acre of riparian vegetation), and no jurisdictional wetlands or wetlands vegetation. Excavation would temporarily impact these waters by removing vegetation and altering topographic features, resulting in a less than significant impact.

As shown in Table 3.15, the proposed project would result in an increase of 0.58 acre of hardscape (i.e. concrete lining and rock revetment) below OHWM in Reach 4. This increased hardscape would be within waters of the U.S. and the State. In addition, the proposed project would result in an increase in hardscape of less than 0.001 acre above OHWM. The total increase in hardscape in Reach 4 would be 0.58 acre. The proposed project would widen the channel, increasing the amount of area below OHWM (and thus waters of the U.S. and of the State) by 1.18 acres. Therefore, the permanent impact on jurisdictional waters would be less than significant.

This reach includes a small stand of riparian vegetation which has formed below the top of bank at the upper end of Reach 4. This riparian area, which totals 0.18 acre, would not be excavated during construction. Although no direct removal of native trees would occur in Reach 4, ground excavation in the root zone may adversely affect these riparian trees. Seven native trees, consisting of four coast live oaks and three Fremont cottonwoods are located on the lower portion of the bank and would likely

suffer substantial root damage due to sediment removal. Those trees would likely have to be removed. In addition one native arroyo willow located on the east bank in the central portion of the reach would be removed during construction of the access road. The cumulative dbh of the trees to be removed would be 229 inches. Removal of these healthy trees would be a significant impact.

Table 3.15 Amount of Exposed Hardscape Materials (Reach 4)*

Type of Material	Pre-Construction (square feet/acres)	Post-Construction (square feet/acres)	Amount of Change (square feet/acres)
Concrete Below OHWM	5,987/0.14	26,242/0.60	+20,255/0.47
Type of Material	**Pre-Construction (square feet/acres)**	**Post-Construction (square feet/acres)**	**Amount of Change (square feet/acres)**
Concrete Above OHWM	1,790/0.04	1,813/0.04	+23/0.0005
Rock Revetment Below OHWM	548/0.01	5,416/0.12	+4,868/0.11
Rock Revetment Above OHWM	1,022/0.02	1,173/0.027	+151/0.003
Concrete Sandbag Below OHWM	83/0.002	0/0	-83/-0.002
Concrete Sandbag Above OHWM	350/-0.008	0/0	-350/-0.008
*Source: Tetra Tech 2015e.			

OPERATIONS (ALL REACHES). The proposed project would increase maintenance and operations activities above the baseline by adding inspections and maintenance of floodwalls and the UPRR culvert. These activities would not adversely affect biological resources.

MITIGATION. Mitigation Measure BIO-B requires compensation for native trees and shrubs removed during construction. Measure BIO-D requires the establishment of a buffer zone around riparian trees during construction to prevent root damage. Although impacts to grasslands are less than significant, and mitigation is not required, Mitigation Measure BIO-C would further reduce this impact by requiring use of native grass and forbs seeds during hydroseeding of disturbed areas.

SIGNIFICANCE AFTER MITIGATION. Implementing Mitigation Measure BIO-B would reduce impacts to trees and shrubs to less than significant by requiring replacement of native trees and shrubs with dbh of 2 in or greater. Mitigation Measure BIO-D would further reduce impacts to riparian habitat in Reach 4 by providing buffers around riparian trees.

BIO-4 INTERFERE SUBSTANTIALLY WITH THE MOVEMENT OF ANY NATIVE RESIDENT OR MIGRATORY FISH OR WILDLIFE SPECIES, OR WITH ESTABLISHED NATIVE RESIDENT OR MIGRATORY WILDLIFE CORRIDORS, OR IMPEDE THE USE OF NATIVE WILDLIFE NURSERY SITES

Less than significant with mitigation for construction; less than significant for operations

CONSTRUCTION (REACHES 1–3). Forty-five native trees and shrubs would be removed in Reaches 1 to 3 during construction of the proposed project. Trees provide foraging, roosting, and nesting habitat for migratory birds, a category which includes most of the birds identified in the existing conditions section, as well as resident birds. Although there are numerous other trees in the area that can provide this function, destruction of migratory bird nests during construction would result in a significant impact.

Upper Berryessa Creek may serve as a dispersal corridor for terrestrial wildlife, so construction may temporarily impair their ability to move between the upper and lower parts of the watershed. However, as stated in the CAR (USFWS 2013), the proposed project areas does not support significant populations of wildlife, and its use as a dispersal corridor is likely of benefit primarily to such species as coyotes and feral cats. The only native fish species that may occur in the project area is the California roach, which may occur in Reaches 1 and 2 below the Piedmont Creek confluence. This fish is not dependent on the habitat in Reaches 1 and 2, and it is likely found in other parts of Berryessa Creek with perennial flow. Therefore, impacts to fish and wildlife movement, nursery sites, and dispersal corridors other than impacts on migratory birds would be less than significant.

The Monarch butterfly *(Danaus plexippus),* passes through the region during its migration but is not known to reside in the project area. Although this species was not observed during field visits, large trees that may offer roosting habitat for the butterfly are present in the overbank areas. Its primary forage host plant, milkweed *(Asclepias* sp.*),* was also not observed during field visits. Removal of vegetation could adversely affect habitat for this species. Based on the lack of known occurrence at the project area and the limited habitat value in the project area, impacts to the monarch butterfly would be less than significant.

CONSTRUCTION (REACH 4). Impacts to wildlife movement, dispersal and nursery sites would be the same as in Reaches 1–3, except that no fish would occur in this reach as it is dry most of the year. Impacts to migratory birds would be less than significant because only a small number of trees would be removed and many more trees would be retained. Impacts to fish and wildlife movement, nursery sites, and dispersal corridors would be less than significant.

OPERATIONS (ALL REACHES). Maintenance and operations activities resulting from the proposed project would not interfere with migration or dispersal of wildlife or the use of the project areas as a nursery site. Therefore, there would be no impacts from operations.

MITIGATION. Mitigation Measure BIO-A would require pre-construction nesting bird surveys and establishment of appropriate buffers, reducing impacts to nesting resident bird species.

SIGNIFICANCE AFTER MITIGATION. By establishing buffers during construction to prevent damage to active nests, Mitigation Measure BIO-A would reduce impacts to migratory birds to less than significant with mitigation.

BIO-5 CONFLICT WITH ANY LOCAL POLICIES OR ORDINANCES PROTECTING BIOLOGICAL RESOURCES, SUCH AS A TREE PRESERVATION POLICY OR ORDINANCE

Less than significant with mitigation for construction; no impact for operations

CONSTRUCTION (REACHES 1–3). Forty-five native trees and shrubs would be removed during construction of the enlarged channel and access road on the east bank of the channel in Reaches 1 through 3, including 4 California nutmeg, 8 coast live oak, 1 coyote brush, 2 elderberries, 2 Fremont cottonwoods, 1 redwood, 20 toyons, 1 valley oak, and 6 white alders. Additional non-native trees and shrubs would be removed. Although most of these trees are planted trees located at the edge of the ROW, they provide roosting, foraging, and possible nesting habitat for birds.

The project would remove two trees with DBH exceeding 37 inches in the City of Milpitas, consisting of one native elderberry and one non-native pine tree. Both trees are located in Reach 3. These trees are of sufficient size to be covered by the City of Milpitas Tree Ordinance, which protects trees with circumference of 37 inches or greater. Trees may also be harmed by damage to the roots during construction, either directly or by compaction of soils around the root zone. If roots are directly damaged by construction equipment, tree mortality would likely occur during the construction period; however, damage caused by soil compaction would be apparent over the longer term. USACE would be constructing the project and as a Federal agency would not be obtaining a tree removal or development permit from the City of Milpitas. The number of trees affected would be small; however, removal of trees covered by the City ordinance without City approval would be inconsistent with the ordinance's underlying tree protection policy, and therefore would be a significant impact.

A large valley oak, which is also a heritage tree, located at the edge of the staging area in the UPRR yard, could be affected if construction staging activities occur within the tree root zone. The project layout includes a setback of construction staging to avoid impacts to this heritage tree.

CONSTRUCTION (REACH 4). Project construction would remove eight native trees consisting of one arroyo willow, four coast live oaks, and three Fremont cottonwoods in the City of San Jose. Additionally, a handful of non-native trees/shrubs would be removed in the City of San Jose. Four of the native trees to be removed, one coast live oak and three Fremont cottonwoods, have diameters exceeding 18 inches (which is equivalent to a circumference of 56 inches). The City of San Jose Tree Ordinance applies to trees on private lands and street trees. The trees to be removed are located on public land owned by SCVWD and their removal would not conflict with the local tree ordinance. No heritage trees are located in the project area and none would be affected. This impact would be less than significant.

OPERATIONS (REACHES 1–3). In compliance with USACE Engineering Circular EC 1110-2-6067, Certifications of Levee Systems for the National Flood Insurance Program (USACE 2008), tree growth would be prevented within 15 feet of the proposed floodwall in Reaches 2 and 3. Ongoing and future vegetation management conducted under the District's SMP2 Program would include application of herbicides, mowing, and removal of trees up to 6 inches in diameter within the creek channel. These activities are permitted under SMP2 and would be extended to the floodwall vegetation-free zone as required by the USACE engineering circular. Trees would be removed before they grow large enough to develop features that provide habitat for birds or other species, and their removal would not conflict with the City of Milpitas Tree Ordinance, which only protects larger trees. Operations in Reaches 1–3 would not be in conflict with City of Milpitas Tree Maintenance and Protection Ordinance; therefore, there would be no impact.

OPERATIONS (REACH 4). In compliance with USACE Engineering Circular EC 1110-2-6067, Certifications of Levee Systems for the National Flood Insurance Program (USACE 2008), trees would not be planted or allowed to grow within 15 feet of the buried floodwall in Reach 4. This floodwall has a length of about 450 ft and is entirely within the City of Milpitas. The trees would be removed before they develop features that provide habitat for birds or other species, and while they are too small to be covered by the City of Milpitas Tree Maintenance and Protection Ordinance. The removal of trees in the floodwall vegetation-free zone and creek channel would not conflict with the City of Milpitas Tree Ordinance, which only protects larger trees. As part of SMP2 vegetation management activities, District staff would prevent tree growth in the creek channel or remove trees before they grow to 6 inches in diameter. This would occur within both Milpitas and San Jose. District vegetation management activities would not affect trees large enough to be covered by the City of Milpitas or City of San Jose tree ordinances.

Operations in Reach 4 would not be in conflict with local tree ordinances; therefore, there would be no impact.

MITIGATION. Mitigation Measure BIO-B requires that removed native trees and shrubs with dbh equal to or greater than 2 in dbh would be replaced~~ so that the dbh of the planted trees and shrubs is equal to the dbh of the removed trees~~. Mitigation Measure BIO-D requires the establishment of buffer zones around the base of riparian trees, in which excavation would not occur. Because BIO-B applies to trees that are smaller than those covered by the City of Milpitas tree ordinance, implementation of the measure would result in planting ~~in~~ a greater number of native trees than the trees removed by the project and covered by the City ordinance. Those trees would be planted at appropriate locations in the project area, mostly within the City of Milpitas. Planting of native trees and shrubs to replace those removed as required by Mitigation Measure BIO-B would further the tree protection policies underlying the City ordinance and reduce this impact to a less than significant level.

SIGNIFICANCE AFTER MITIGATION. Implementing Mitigation Measure BIO-B would reduce impacts on trees and shrubs protected by the Milpitas ordinance to less than significant by requiring replacement of removed native trees and shrubs of 2 in dbh or greater. Mitigation Measure BIO-D would further reduce impacts to riparian habitat by providing buffers around riparian trees in Reach 4.

BIO-6 CONFLICT WITH THE PROVISIONS OF AN ADOPTED HABITAT CONSERVATION PLAN, NATURAL COMMUNITY CONSERVATION PLAN, OR OTHER APPROVED LOCAL, REGIONAL, OR STATE HABITAT CONSERVATION PLAN

No impacts for construction; no impacts for operations

CONSTRUCTION (REACHES 1–3). There are no HCPs or Natural Community Conservation Plans (NCCPs) that apply to Reaches 1–3; therefore, there would be no conflict with the provisions of any HCPs or NCCPs, and there would be no impacts from construction.

CONSTRUCTION (REACH 4). The upstream portion of Reach 4 is within the Plan Area of the Santa Clara Valley HCP; however, because the proposed project is being led by the USACE, it is exempt from the HCP. Additionally, the portion of the project area within the HCP area is not modeled as habitat for any of the special status species addressed by the plan. No impacts to HCPs or NCCPs would result.

OPERATIONS (REACHES 1–3). There are no HCPs or NCCPs that apply to Reaches 1–3; therefore, there would be no conflict with the provisions of any HCPs or NCCPs, and there would be no impacts from operations.

OPERATIONS (REACH 4). A portion of Reach 4 is within the City of San Jose and this portion of the project area is within the geographic area covered by the Santa Clara Valley HCP. The Valley HCP exempts projects led by USACE. Because the proposed project would be constructed by USACE, it is exempt from the Valley HCP**.**

3.5.6. Mitigation Measures

The following measures would be implemented to mitigate impacts to biological resources.

BIO-A: PERFORM PRE-CONSTRUCTION NESTING BIRD SURVEYS AND ESTABLISH APPROPRIATE BUFFERS. The District will work with the USACE to require the construction contractor to implement the

following measures. Prior to construction and during the nesting season (generally mid-April to late July), a qualified biologist will perform nesting bird surveys following established protocols. If nests are detected at staging areas and construction sites during these surveys, a 50-foot no-construction buffer will be delineated around the nest until young have fledged (300-foot buffer for raptors). This measure is consistent with Recommendation 3 contained in the USFWS CAR (USFWS, 2013).

BIO-B: COMPENSATE FOR TREES AND SHRUBS REMOVED DURING CONSTRUCTION~~. USACE will implement the following measures. If a native tree or shrub with a diameter at breast height of 2 inches or greater is removed during project construction, USACE will replace it within the project vicinity , so that the combined diameter of the container plantings is equal to the combined diameter of the trees removed. This measure is consistent with Recommendation 1 contained in the USFWS CAR (USFWS, 2013).~~ The following measure to mitigate for removal of native trees and shrubs has been coordinated between USACE and USFWS. This measure represents a variation on the CAR native tree and shrub replacement formula, and was agreed to by the two agencies to move forward without formally revising the CAR:

1) Use seeds or cuttings collected at or near the project area, or higher in the watershed if on-site collection is not feasible, for replanting.
2) Replace the 53 affected native tree and shrubs at the following rates:
    - Native trees greater than 2 inches and up to 8 inches dbh: plant 1 native tree for each tree removed;
    - Native trees greater than 8 inches and up to 20 inches dbh: plant 2 native trees for each tree removed;
    - Native trees greater than 20 inches dbh: plant 3 native trees for each native tree removed;
    - Native shrubs: plant 2 native shrubs for each native shrub removed.

This would result in replanting about 60 native trees and 46 native shrubs.

BIO-C. USE NATIVE GRASS AND FORBS MIX TO HYDROSEED AREAS DISTURBED BY CONSTRUCTION ACTIVITIES. The District will work with the USACE to require the construction contractor to implement the following measure. Disturbed areas will be hydroseeded using a seed mix containing only native California grass and forbs seeds. This measure is consistent with Recommendation 4 contained in the USFWS CAR (USFWS, 2013).

BIO-D. PROVIDE BUFFER AROUND RIPARIAN TREES. The District will work with the USACE to require the construction contractor to implement the following measures. Tree protection will be included in the project construction plans and specifications and will specify a buffer area around the bases of riparian trees located on the southwest corner of the upstream bend in Reach 4. The buffer area will protect roots of the trees by establishing a zone from the base of the trees within which potentially damaging actions will not occur, including excavation, placement of rock revetment or other bank stabilizing features. In cases where there are multiple trees that would be protected in this way, a single buffer zone may be established to encompass all trees in that area.

3.5.7. Statement of Impact

A summary of potential impacts is given in Table 3.16. All significant impacts would be offset by implementation of mitigation measures, and would be reduced to less than significant.

Table 3.16 Statement of Impacts, Biological Resources			
Impact	**Prior to Mitigation**	**Mitigation Measures**	**After Mitigation**
CONSTRUCTION			
BIO-1. Have a substantial adverse effect, either directly or through habitat modification, on any species identified as candidate, sensitive, or specials status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS.	LS	None	LS
BIO-2. Have a substantial adverse and unmitigated effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFW, or USFWS or healthy stands of trees and shrubs.	S	BIO-B BIO-C BIO-D	LM
BIO-3. Have a substantial adverse and unmitigated effect on Federally protected wetlands as defined by Section 404 of the CWA (including, but not limited to, marsh, vernal pool, and coastal) through direct removal, filling, hydrological interruption, or other means.	LS	None	LS
BIO-4. Interfere substantially with the movement of any native resident or migratory fish or wildlife species, or with established resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.	S	BIO-A	LM
BIO-5. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.	S	BIO-B BIO-D	LM
BIO-6. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State Habitat Conservation Plan.	NI	None	NI
NI–No Impact, LS–Less than Significant, LM–Less than Significant with Mitigation, S–Significant, SU–Significant and Unavoidable			

3.6. CULTURAL RESOURCES

This section addresses the potential impacts to cultural resources associated with the construction and operation of the proposed project. Paleontological resources are also briefly discussed in this section, although soils conditions in the project area are such that significant paleontological resources are unlikely to occur.

3.6.1. Environmental Setting

Cultural resources are past and present expressions of human culture and history in the physical environment and include prehistoric and historic archaeological sites, structures, natural features, and biota that are considered important to a culture, subculture, or community. The term also includes aspects of the physical environment that are a part of traditional lifeways and practices and are associated with community values and institutions. Cultural resources are often divided into categories of prehistoric and historic. In northern California, cultural resources extend back in time for at least 9,000-11,500 years with Native American occupation and use of the Santa Clara Valley extending over 5,000-8,000 years and possibly longer. For the purposes of this EIR, the terms "prehistoric" or "pre-contact" are used to describe any material remains, structures, and items used or modified by people

before Euro-Americans established a presence in the region. The term “historic” is used to refer to material remains and the landscape alterations that have occurred since the arrival of Europeans. Historical resources are a regulatory subset of cultural resources that meet specific eligibility criteria for listing on the California Register of Historical Resources (CRHR) (Public Resources Code [PRC] 5024.1; CCR Title 14, Section 4850.3; and CEQA Guidelines, Section 15064.5(a)). These include resources within California that are listed on the National Register of Historic Places (NRHP) (“historic properties”; 36 CFR 60.4), which are automatically listed on the CRHR. Unique archaeological resources are another subset of cultural resources that include prehistoric and historic archaeological resources that can contribute to current research questions, are considered unique or special in the field of archaeology, and are related to a specific event or person (PRC 21083.2(g)).

Paleontological resources are items that reveal evidence of the prehistoric past, and are generally in the form of fossilized plant or animal remains that are embedded in rock formations. Fossils are also occasionally found in deposits of eroded rock formations at the base of cliffs or in streams. Other forms of paleontological resources include plants or animals that are preserved in mediums including peat bogs, tar pits, or ice fields.

3.6.2. Existing Conditions

The composition of substrate in and around the Upper Berryessa Creek channel is indicative of historic floodplains or alluvial fans, placed artificial fill, and urbanized conditions. Floodplain or alluvial substrate is generally a mix of poorly sorted clays, silts, sand, and gravel of varying thicknesses, overlaying bedrock. It is in the bedrock that fossils would generally be found. Artificial fills may be comprised of soils from a wide variety of sources, and any paleontological resources which they may have originally contained would generally be destroyed during excavation and placement. Urban soils likewise have often been disturbed during previous development to allow for housing, commercial development, infrastructure placement, and transportation projects. These types of deposits are very unlikely to contain significant fossils or other types of paleontological resources. Furthermore, the proposed project would not disturb bedrock. Therefore, paleontological resources are unlikely to be present at the project area and are not discussed further in this document.

The settings described below are taken primarily from a 2010 cultural resources survey conducted for the project by Basin Research Associates, Inc. on behalf of the U.S. Army Corps of Engineers – Sacramento District (Basin Research Associates 2010).

3.6.2.1. *Prehistoric Context*

The project area is within an area that has been favored by Native Americans for occupation as well as hunting and collecting activities. The area would have provided a favorable environment during the prehistoric period with riparian and terrestrial resources readily available and the bayshore in relative close proximity. Native American occupation sites in the region appear to have been selected for accessibility, protection from seasonal flooding, and the availability of resources for both food and industrial use.

Archaeological information for the general Bay Area suggests a slow steady increase in the prehistoric population over time with an increasing focus on permanent settlements that could support large populations in later periods. This change from hunter-collectors to an increased sedentary lifestyle is due to more efficient resource procurement as well as a focus on staple food exploitation, the increased

ability to store food at village locations, and the development of increasing complex social and political systems including long-distance trade networks.
Prehistoric site types recorded in the Santa Clara Valley include habitation sites ranging from villages to temporary campsites, stone tool and other manufacturing areas, quarries for tool stone procurement, cemeteries usually associated with large villages, isolated burial sites, rock art locations, bedrock mortars or other milling feature sites, and trails (Elsasser 1986:32).

Archaeological research in the region has been interpreted using several chronological schemes based on stratigraphic differences and the presence or absence of various cultural traits. The Central California Taxonomic System was developed by archaeologists to explain local and regional cultural change from about 4,500 years ago to the time of European contact (Lillard et al. 1939; Beardsley 1948, 1954). The scheme includes three phases: Early, Transitional (also referred to as Middle), and Late Horizons, described below.

The Early Horizon (ca. 4,500 to 3,500/3,000 years ago) is the most poorly known of the periods. However, it is believed that Hokan-speaking peoples initially occupied the project area. Hunting and fishing were the basic source of subsistence goods. Other markers characteristic of Early Horizon archaeological deposits include milling stones (suggestive of processing vegetal foods) and atlatl tips and parts (i.e., a throwing board and spear). Early Horizon sites typically are absent of fire-altered rock, charcoal, ash, and greasy and organic midden soils (soils that have been culturally affected). Regional cultures during this time practiced elaborate burial rituals that included placing a wealth of goods in graves. Well-developed trade networks with other areas of the Pacific Coast and Sierra Nevada were also developed by this time.

Middle Horizon (ca. 3,500 to 1,500 years ago) sites are more common and relatively better known than Early Horizon sites. These sites usually have deeply stratified deposits with large quantities of ash and charcoal, fire-altered rock, and fish, bird, and mammal faunal remains. The presence of significant numbers of groundstone artifacts is suggestive of an increased reliance on gathered plant foods as opposed to hunted animal foods. The aboriginal populations were unchanged from Early Horizon peoples. Burial patterns do change from the Early Horizon however. Middle Horizon burials are typically found in a flexed position with only a few utilitarian grave goods. A relatively high number of embedded projectile points found in skeletal remains of this period along with other indicators suggest an increase in violence during the period.

The Late Horizon (ca. 1,500 to 250 years ago) emerges from the Middle Horizon with the continued use of many early traits and the introduction of several new traits. Late Horizon sites are the most numerous in the region. These deposits are composed of rich, greasy midden soils with bone and fire-altered rocks. Use of the bow and arrow, flexed interments, deliberately damaged or "killed" grave offerings, and occasional cremation of the dead are among the known traits of this horizon. Dietary emphasis on acorns and seeds is also evident through the inclusion of groundstone artifacts in site assemblages as well as through paleobotanical studies. Trade for various raw materials was well established with surrounding and other areas. Compared to earlier peoples, Late Horizon groups were short in stature with finer bone structure. This is considered evidence of population replacement of the original Hokan-speaking settlers by Penutian-speaking groups by ca. 1,500 years ago.

3.6.2.2. *Ethnographic Context*

The aboriginal inhabitants of the Santa Clara Valley belonged to a group known as the "Costanoan," derived from the Spanish word *Costanos* ("coast people" or "coastal dwellers") who occupied the central California coast as far east as the Diablo Range. The term refers to several different groups of people who shared similar cultural traits and belonged to the same linguistic family. Modern populations of these individuals generally prefer the term *Ohlone*.

In 1770 the Ohlone lived in approximately 50 separate and politically autonomous tribelets with each group having one or more permanent villages surrounded by a number of temporary camps. Physiographic features usually defined the territory of each group which generally supported a population of approximately 200 persons (Kroeber 1925:462; Levy 1978:485, 487; Hart 1987:112-113). Known tribelet boundaries and village locations are inexact due to incomplete historic records, and they remain a subject of anthropological contention and debate. The project may have been situated within the former territory of the Alson, "Santa Ysabel," and/or possibly Tamyen (Tamien) subgroups of the Ohlone Indians (Kroeber 1925; Levy 1978:485, Fig. 1; Milliken 1983:139, Map 4; Milliken 1995:229, Map 5, 235, 256; Hylkema 1995:35-36, Map 6; Hart 1987:324). The Alson territory encompassed the low marshlands in South San Francisco Bay, likely including the area around the mouth of the Coyote River where modern-day Newark, Milpitas, and Alviso exist. Mission Santa Clara records indicate the group was referred to as the “Santa Agueda” and the population had been “nearly depleted” by 1797. The Santa Ysabel territory encompassed the eastern part of Santa Clara Valley as well as the upper drainage of Calaveras Creek. The group was centered at present-day Alum Rock on Penitencia Creek. Mission Santa Clara registers refer to two Santa Ysabel villages: Ottasimin and Socotach (Milliken 1983:100-101; Milliken 1995:253; Milliken et al. 2007:100, Fig. 8.1).

Historic accounts of the distribution of tribelets and villages in the 1770s-1790s combined with the results of archaeological research in the area suggest that Native Americans may have had numerous temporary camps within the vicinity of the project throughout the prehistoric period and into the Hispanic Period. Unfortunately, extensive ethnographic data on the Ohlone are lacking and the aboriginal lifeway apparently disappeared by approximately 1810 due to introduced diseases, a declining birthrate, the cataclysmic impact of the mission system and the later secularization of the missions by the Mexican government (Kroeber 1925; King and Hickman 1973; Levy 1978).

3.6.2.3. *Historic Context*

The historic period (AD 1769 – present) of the project region can be divided into two periods or themes: the Hispanic Period and the American Period.

HISPANIC PERIOD. The Spanish philosophy of government in northwestern New Spain between 1769 and 1821 was directed at the founding of presidios, missions, and secular towns with the land held by the Crown. The later Mexican policy between 1822 and 1848 stressed individual ownership of the land. After the secularization of the missions was declared by Mexico in 1833, vast tracts of the mission lands were granted to individual citizens (Hart 1987).

Spanish explorers in the late 1760s and 1770s were the first Europeans to traverse the Santa Clara Valley. The first party, led by Gaspar de Portola and Father Juan Crespi, arrived in the Alviso area in the fall of 1769. Sergeant Jose Francisco Ortega of their party explored the eastern portion of San Francisco Bay and likely forded the mouths of the Guadalupe River and Coyote Creek (Beck and Haase 1974:#16-

17; James and McMurry 1933:8). The following year, 1770, Pedro Fages led another party through the Santa Clara Valley and in 1772 Fages returned with Crespi. A few years later, in 1776, Juan Bautista de Anza and Father Pedro Font traveled through the region and their favorable reports led to the establishment of both Mission Santa Clara and the Pueblo San Jose de Guadalupe in 1777.

As mapped by Beck and Haase (1974:#17), expeditions of Ortega, Fages, and Anza and Font between 1769 and 1776 would have crossed Upper Berryessa Creek just north of present-day State Highway 237/Calaveras Boulevard, downstream of the project area. The 1776 Juan Bautista de Anza route, a designated National Historic Trail as mapped by the National Park Service (1995), crosses the same area.

Mission Santa Clara de Asis, founded in 1777, was the eighth of 21 California missions established by the Spanish and the seventh established in Ohlone territory. Mission Santa Clara would have been the mission with the greatest impact on the aboriginal population living in the project vicinity. The nearby Pueblo of San Jose, also founded in 1777, was the first pueblo in Alta California. It was founded to administer and coordinate the missions and presidios in the province (Hall 1871:48; Hart 1987:446, 454).

RANCHOS, TRACTS, AND ROADS. The project area is located within the former Rancho Milpitas (Alviso) and far northwest portion of former Pueblo Lands of San Jose de Guadalupe. The area would have been suitable for grazing cattle, the major economic pursuit of the Santa Clara Valley and California during the Hispanic Period (Stratton 1862; Thompson 1866; Hendry and Bowman 1940; USGS 1980). Rancho Milpitas (Berryessa) was granted by Pedro Chaboya, Alcalde (municipal officer with administrative and judicial functions) of San Jose in May 1834 to Nicolas Berryessa, but was rejected.

Chaboya was Alcalde in 1836, at the same time Nicolas Berryessa (1761-1804) was a member of the Anza expedition (1776), a regidor (a member of the cabildo or "municipal corporation of town council charged with local municipal government") of the Pueblo of San Jose. He married Gracia Padilla (a member of the Peralta family) and had eleven children. As a result, the family had large landholdings in the present-day counties of Santa Clara, Napa, Alameda, and Sonoma. Berryessa's life was problematic - he was subject to the predations of John C. Fremont's battalion during the Bear Flag Rebellion who not only "plundered" his cattle, but also killed the son of his brother, Jose de los Reyes, near San Rafael in June 1846. In addition, he had problems with squatters and his claim for Rancho Milpitas was rejected. Berryessa died insane in 1863 (Hoover et al. 1966:443-444; Egan 1977:543, #33). However, his namesakes in the region remain, including Upper Berryessa Creek, the settlement of "Berryessa," a school, and a road in Santa Clara County, as well as a valley and artificial lake in Napa County (Hart 1987:46).

None of the known Hispanic-era dwellings or other cultural features indicated on historic maps are within or adjacent to the project area (Stratton 1862; Hendry and Bowman 1940:856-863; Hoover et al. 1966:444; Arbuckle and Rambo 1968:23-24; USGS 1980).

AMERICAN PERIOD. The population of the Santa Clara Valley expanded during the American Period as a result of the Gold Rush (1848), followed later by the construction of the railroad to San Francisco (1864) and the completion of the transcontinental railroad in 1869. Throughout the late nineteenth century in the Santa Clara Valley Hispanic Period rancho, pueblo, and mission lands were subdivided. Large cattle ranches were converted to farming varied crops, and this agricultural land-use pattern continued throughout the American Period.

During the early American Period (1847-1876) stock-raising predominated, but declined after the drought of 1863-1864. After this, wheat-growing became the primary agricultural activity (Bean 1978) along with dairy farms, and orchards in the 1860s-1870s. The arrival of the San Francisco and San Jose Railroad (1863-1864), followed by the development of the refrigerated railroad car (ca. 1880s) had major impacts on the general area. After 1875, the success of many agricultural experiments and expansion of markets via the railroad encouraged the development of horticulture in the Santa Clara Valley. As a result, during the later American Period and into the Contemporary Period (ca. 1876-1940s), horticulture/fruit production became a major industry. From 1875 onward, the need for an expanding market led to innovations in fruit preservation and shipping including drying fruit, canning fruit, and shipping fresh fruit in refrigerated cars (Findlay and Garaventa 1983). In turn, this created a wider economic boom which attracted new residents to the Santa Clara Valley (Broek 1932:76-83; Hart 1987).

The project is in the City of Milpitas, with the far southern, upstream extent of the project area within the northeastern part of the City of San Jose. Santa Clara County, named after Mission Santa Clara, was one of the original 27 counties of California. San Jose has been the County seat since the beginning and was not only the first pueblo in Alta California, but also the first capital of the State of California.

Within the Santa Clara Valley, the City of San Jose, founded in 1777 under Spanish authority, served as a County seat, a primary service as well as financial and social center. Most of the institutions for higher education and the citizen elite resided in San Jose or its twin, the City of Santa Clara (Broek 1932; Hendry and Bowman 1940:750; Hoover et al. 1966:425; Hart 1987:445-446; Patera 1991:188). San Jose has functioned as the "chief City" annexing former smaller rural settlements such as Berryessa. The Pueblo of San Jose, located in what is now downtown San Jose, later expanded to include the former settlement of Berryessa, initially about 4 miles northeast of San Jose.

The small village of Berryessa was situated in a noted "rich fruit region" complete with drying plants. It warranted a post office between May 1889 and October 1904 and included a school, church, store, and blacksmith shop as well as a number of residences by 1896. The post office was reestablished in June 1976 as a classified station of the City of San Jose (San Jose Mercury 1896:132; Broek 1932; Hendry and Bowman 1940: Map of Pueblo San Jose about 1803 to 1854; Patera 1991:18; USGS 1980).

Milpitas was located on the western boundary of the Pueblo of San Jose and named after the Rancho Milpitas. The town was initially known to the Spanish as "Penitencia," purportedly after the creek to the west named for "a house of penitence, a small adobe building where priests from the mission came at stated intervals to hear confessions" (Hoover et al. 1966:444). It was a "sporting center" for Mexicans living in the general area at least once a year with horse racing, dancing, bull fighting, and other Mexican sports. The historic center of Milpitas, about 0.75 miles west of the northern, most downstream portion of the project, was on the flatlands inland from Southern San Francisco Bay near the confluence of Arroyo de las Coches and Penitencia Creek. It was along the road east to Calaveras Valley and the north-south mission road, later known as the "road from Oakland to San Jose." It was initially settled by an Irishman, Michael Hughes, in 1852, followed by a store and school in 1855, a post office in May 1856, and hotel in 1857. The soils in the area were exceptionally fertile, particularly suited to strawberries, pears and asparagus. Further east, wheat and hay were profitably grown (Stratton 1862; Munro-Fraser 1881:305-306; San Jose Mercury 1896:104, 106; Sawyer 1922:296; Hoover et al. 1966:444; Loomis 1986:1; Patera 1991:136).

During the early American Period, the region was apparently sparsely settled, appropriate for cattle grazing, and later raising crops. As a result, both Milpitas and Berryessa were and still are stops on the rail routes through the area. Milpitas was a noted shipping depot (San Jose Mercury 1896:106).

3.6.2.4. *Archaeological Context*

As indicated in Basin Research Associates (2010), research conducted in the northern Santa Clara Valley since the early 1980s has underscored the high potential for buried prehistoric archaeological sites in the vicinity of the Guadalupe River and Coyote Creek as well as other drainages (e.g., see TCR 1980; Findlay and Garaventa 1983; Anastasio 1984; Ambro 1996; Basin Research Associates 1997; see Meyer 2000 for a summary).

The Guadalupe River and Coyote Creek were prime foci of prehistoric occupation in the Santa Clara Valley and Native American use of the project area continued into the Hispanic and American periods. Many of the prehistoric sites recorded in the general project area appear to be "midden" sites and include both former mound sites as well as sites now buried under sedimentary soils. A number of the recorded sites have yielded Native American skeletal remains ranging from isolated burials to several hundred individuals associated with prehistoric village locations. Chronologically, occupation in the area clearly ranges from the Middle Archaic Period (3000-500 BC) to the Late Emergent Period (AD 1800) with many of the sites having multiple, but non-continuous occupations through time.

The prevalence of buried archaeological sites in the general area is largely due to the repeated overbank flooding of the Guadalupe River and Coyote Creek which have resulted in the deposition of alluvium throughout the area especially in the vicinity of extant water courses (TCR 1980:24). Researchers have noted that there is usually no surface indication of buried prehistoric cultural materials and often the presence of large, complex sites is not clearly suggested by the occasional sparse surface indicators noted during a surface inventory.

Several researchers in the Santa Clara Valley have noted that the presence or absence of certain soil types may indicate some potential for buried cultural resources. Anastasio (1988) has observed that Upper Archaic Period sites in the Guadalupe River floodplain tend to be associated with basin soils, while the later Emergent Period sites tend to associated with alluvial soils.

3.6.2.5. *Records and Literature Search*

Basin Research Associates requested a prehistoric and historic site records search for the project area via the Northwest Information Center at California State University, Sonoma on behalf of the Army Corps of Engineers – Sacramento District in February 2009 (File No. 08-0825). In addition, reference material from the Bancroft Library, University of California, Berkeley, the Santa Clara County Surveyor's Office, and Basin Research Associates, San Leandro were consulted.

Thirty-one compliance reports on file with the Northwest Information Center include the project area. The records search also identified three prehistoric cultural resources and one reported cultural resource within or adjacent to the project area. These include CA-SCL-156/P-43-000168 (lithic scatter), CA-SCL-157/P-43-000169 (isolated artifact mistakenly recorded as a site), and CA-SCL-593/P-43-000588 (prehistoric deposit with human remains). The reported but unrecorded resource is C-167, a midden deposit that is possibly from or part of CA-SCL-593. One recorded Native American reburial location is mapped within 0.25 mile of the project. One of the recorded sites, CA-SCL-593 (P-43-000588), is bisected by the project area and is the only one of the previously recorded resources that is recommended as NRHP-eligible. CA-SCL-156/P-43-000168 (lithic scatter) and CA-SCL-157/P-43-000169 (isolated artifact mistakenly recorded as a site) are not of significance and are not discussed further below.

CA-SCL-593 (P-43-000588). Archaeological site CA-SCL-593 (P-43-000588), a prehistoric deposit with human remains, was observed in April 1986 eroding from the west bank of channelized Upper Berryessa Creek. The project area crosses through the mapped boundaries of the site. The USACE contacted Santa Clara Valley Water District about the find. Archeological Resource Management was engaged to investigate and excavate. The deposit was visible within the creek bank on both sides of Upper Berryessa Creek and observed to continue away from the creek.

Two burials were recovered from the site in 1986. The partially exposed Burial 1 was located in one bank between 130 and 150 cm below the ground surface and excavated. It consisted of a semi-flexed, partial skeleton of a young female (18 to 20 years of age). Burial 2 was found eroding from the opposite bank and at the bottom of the midden deposit. It consisted of the skeletal remains of a young child of undetermined sex. In addition midden was noted to a depth of approximately 160 cm. in a single excavated test unit placed away from the bank (Cartier and San Filippo 1987). Finds from CA-SCL-593 have been limited and consist of mostly fire cracked rock, with hearth features "suspected ... based on frequency of [fire-cracked rock]", but also includes vertebrate and invertebrate remains, bone tools, lithic debitage, groundstone, and a charmstone. The site was visited and tested again in 1993 and 1994. This work identified additional downstream trace materials that were attributed to CA-SCL-593 (Cartier 1993, 1994).

Combined with radiometric dates of 1320 +/ 70 years before present (BP) and 1660 +/ 80 BP, the assemblage suggest that CA-SCL-593 was a habitation site dating to between 1300 and 1700 BP during the Late Phase of the Middle Period. This relatively short occupation – approximately 340 years – is attributed to flooding that caused realignment of Upper Berryessa Creek and relocation of the settlement (Stradford and Cartier 1986, Beta Analytic 1986a and 1986b, Cartier et al. 1986, Cartier and San Filippo 1987, 1988).

A survey conducted in February 1992 by Cartier, et al. (1992:19) described CA-SCL-593 as impacted by Milpitas Boulevard, channelized Upper Berryessa Creek, and railroad tracks which "intersect the site." Historic maps indicate that CA-SCL-593 was located about 0.6-mile north of Upper Berryessa Creek on the eastern periphery of trees west of a marshy area (Day 1850-1851). Prior to the channelization of the project area between 1942 and 1961 (e.g., through CA-SCL-593), Upper Berryessa Creek flowed into Penitencia Creek at about Capitol Expressway (U.S. War Dept. 1943, USGS 1961).

CA-SCL-593 (P-43-000588) is not listed in California Office of Historic Preservation's Archeological Determinations of Eligibility list for Santa Clara County (2008). However, the site appears eligible for inclusion on the NRHP under Criterion D. The site is therefore considered eligible for listing on the CRHR as well.

C-167. Reported Site C-167 is a midden deposit that may be part of or redeposited from CA-SCL-593 (P-43-000588). The project area passes through the mapped area of the deposit that was observed in 1987 northwest of CA-SCL-593. Fire-cracked rock and shellfish remains were noted in a localized area. In contrast to CA-SCL-593, little difference was observed in soils color (Dietz and Wilson 1987a, 1987b). Evidence of C-167 was observed in the elevated access road along either side of Upper Berryessa Creek which appear to have been constructed with soils excavated to form the existing creek channel. A large portion of the deposit appeared to have been destroyed by the channelization of Upper Berryessa Creek.

Cartier, et al. (1992:19) revisited C-167 along Upper Berryessa Creek and notes that the site was covered by an industrial building and parking lot with poor visibility due to pavement and landscaping. No cultural material was observed at that time.

The reported site has not been formally recorded or evaluated for NRHP or CRHR eligibility. If the materials are redeposited from CA-SCL-593, the site would not be considered eligible for either register.

3.6.2.6. *Native American Consultation and Public Participation Regarding Cultural Resources*

Basin Research Associates contacted the California Native American Heritage Commission (NAHC) in 2009 for a search of the Sacred Lands Inventory (Busby 2009). The search did not identify any sacred sites within or adjacent to the project area. However, the names of nine Native American individuals/organizations who may have knowledge of cultural resources in the project area were provided (Pilas-Treadway 2009). These individuals were not contacted at that time. However, since that time, a Historic Property Management Plan (HPMP) has been prepared for the burials identified in CA-SCL-593 and was submitted by the landowner, UPRR, to the NAHC. The NAHC has identified and notified the Most Likely Descendant (MLD), who ~~is currently working~~ worked with the landowner to properly excavate and store the remains. This process is explained in greater detail in Section 3.6.2.8. No other local historical societies, planning departments, etc. were contacted regarding landmarks, potential historic sites or structures in or adjacent to the project.

3.6.2.7. *Cultural Resources Survey for the Project*

A systematic archaeological field survey of the project area was conducted by Basin Research Associates in January of 2009 (Basin Research Associates 2010). The pedestrian field survey included both sides of the creek bank and, when possible, the creek channel.

Recorded site CA-SCl-593 (P-43-000588) is within the project area and appears to be larger than as originally recorded. No evidence of reported cultural resource C-167 or any other prehistoric and/or historic era archaeological resources was observed during the survey. Although several bridges and culverts were observed within the project area, most lack identifying numbers and are not considered of historic importance.

3.6.2.8 *Memorandum of Agreement and Historic Property Management Plan for CA-SCL-593.*

In March 2014 a Memorandum of Agreement (MOA) was signed between the USACE and State Historic Preservation Office regarding resolution of adverse effects under the National Historic Preservation Act for the proposed Upper Berryessa Creek Flood Control project. The MOA defined an area of potential effect, dictated the development of a HPMP for data recovery of CA-SCL-593, described reporting requirements, dictated a requirement for construction monitoring and steps to take when addressing any unanticipated discoveries and effects during construction, as well as requirements for Native American consultation.

As the landowner of CA-SCL-593, UPRR notified the Santa Clara County Coroner on December 11, 2014 regarding the burials identified at the site. The Coroner confirmed the remains as Native American and has notified the NAHC to determine a MLD with whom to coordinate regarding the MOA and HPMP and

their implementation. The NAHC has identified and notified the MLD, who coordinated with stakeholders to ensure that the remains were excavated, transported, and stored properly.

A HPMP for treatment of CA-SCL-593 was drafted by USACE – San Francisco District in August 2013 (USACE 2013). The HPMP outlines a two-phased approach to treating the site. Phase 1 – Testing will investigate the nature and extent and condition of the archaeological deposit. Phase 1 of the HPMP field investigations was completed in Fall 2015. Archaeologists carefully excavated and removed the two Native American remains and burial-related artifacts found at the historic site. The human remains were turned over to the Native American MLD for proper reburial. In addition to salvage of the Native American remains and associated artifacts, the Phase 1 archaeological investigations also included the systematic inspection of the creek banks within the boundaries of the historic site, and excavation and examination of 11 trenches to define the boundaries of the historic site. The Phase 1 work appears to have adequately investigated the historic site for the presence or absence of subsurface cultural resources. Therefore additional Phase 2 investigations are not warranted (Basin research Associates, 2015). The data collected during Phase 1 investigations indicates that the boundary of the historic site should be redefined with the northern and southern boundaries moving 50 and 250 ft. north, respectively (Basin Associates, 2015). ~~Phase 2 – Data Recovery will remove the cultural materials and evidence of human funerary practices that are situated within the area of direct impacts that would result from channel excavations and other project features. Following Phase 2 – Data Recovery, T~~The HPMP also requires workforce training and archaeological monitoring of ground disturbing activities associated with the project.

~~As the landowner of CA-SCL-593, UPRR notified the Santa Clara County Coroner on December 11, 2014 regarding the burials identified at the site. The Coroner confirmed the remains as Native American and has notified the NAHC to determine a MLD with whom to coordinate regarding the MOA and HPMP and their implementation. The NAHC has identified and notified the MLD, who is coordinating with stakeholders to ensure that the remains are excavated, transported, and stored properly.~~

3.6.3. Regulatory Setting

3.6.3.1. *State Regulations*

CALIFORNIA ENVIRONMENTAL QUALITY ACT

CEQA applies to all discretionary projects undertaken or subject to approval by the state's public agencies (CEQA Guidelines Section 15002[i]). CEQA (Public Resources Code [PRC] Section 21001[b], [c]) states that it is the policy of the State of California to "take all action necessary to provide the people of this state with… historic environmental qualities…and preserve for future generations examples of the major periods of California history." CEQA Guidelines require that historical and unique archaeological resources be taken into account during the environmental review process. Section 15064.5 of the Guidelines states that "a project with an effect that may cause a substantial adverse change in the significance of a historical resource is a project that may have a significant effect on the environment."

21083.2 ARCHAEOLOGICAL RESOURCES

If the cultural resource in question is an archaeological site, the CEQA Guidelines (Section 15064.5[c][1]) require that the lead agency first determine if the site is a historical resource as defined in Section 15064.5(a). If the site qualifies as a historical resource, potential adverse impacts must be considered in the same manner as a historical resource (CEQA Guidelines Section 15064.5[c][2]). If the archaeological

site does not qualify as a historical resource but does qualify as a unique archaeological resource, then the archaeological site is treated in accordance with CEQA PRC Section 21083.2 (CEQA Guidelines Section 15064.5[c][3]). In practice, most archaeological sites that meet the definition of a unique archaeological resource will also meet the definition of a historical resource.

CEQA (PRC Section 21083.2[g]) defines a “unique archaeological resource” as an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it:

- Contains information needed to answer important scientific research questions, and there is public information in that information.
- Has a special and particular quality, such as being the oldest or best example of its type.
- Is directly associated with a scientifically recognized important prehistoric or historic event or person.

21084.1 HISTORICAL RESOURCES

The CEQA Guidelines (Section 15064.5[a]) define a “historical resource” as including the following:

- A resource listed in, or eligible for listing in, the California Register of Historical Resources;
- A resource listed in a local register of historical resources (as defined at PRC Section 5020.1[k]);
- A resource identified as significant in a historical resources survey meeting the requirements of PRC Section 5024.1(g); or
- Any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California. (Generally, a resource is considered by the lead agency to be “historically significant” if the resource meets the criteria for listing in the CRHR. See further discussion of the CRHR below.)

A project that causes a “substantial adverse change” in the significance of a historical resource may have a significant effect on the environment (CEQA Guidelines Section 15064.5[b]). The CEQA Guidelines (Section 15064.5[b][1]) define “substantial adverse change” as “physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired.” Generally, the significance of a historical resource is “materially impaired” when a project demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its inclusion in or eligibility for the CRHR, or its inclusion in a local register of historical resources (CEQA Guidelines Section 15064.5[b][2]).

CALIFORNIA PUBLIC RESOURCE CODE. California PRC Section 5020-5029.5 establishes the criteria for the CRHR, creates the California Historic Landmarks Committee, and authorizes the Department of Parks and Recreation to designate Registered Historical Landmarks and Registered Points of Historical Interest. It also establishes criteria for the protection and preservation of historic resources. Several other sections of the California Public Resource Code also provide protection of cultural resources. Section 5097-5097.6 provides guidance for State agencies in the management of archaeological, paleontological, and historical sites affected by major public works project on State land. This section is not applicable to the project as there are no State lands involved. Subsections 5097.9-5097.991 establish regulations for the protection of Native American religious places and establish the NAHC. They also require that

California Native American remains and associated grave artifacts be repatriated and that notification of discovery of Native American human remains be made to a MLD.

ADMINISTRATIVE CODE, TITLE 14, SECTION 4307. Administrative Code, Title 14, Section 4307, prohibits individuals from removing, injuring, defacing, or destroying any object of paleontological, archaeological, or historical interest or value.

CALIFORNIA HEALTH AND SAFETY CODE. Several Sections of the California Health and Safety Code provide protection of human remains. Section 7050.5 requires construction or excavation to be stopped near human remains until a coroner determines whether the remains are Native American, and requires the coroner to contact the NAHC if the remains are Native American. Section 7051 establishes removal of human remains from interment, or from a place of storage while awaiting interment or cremation, with the intent to sell them or to dissect them with malice or wantonness as a public offense punishable by imprisonment in a State prison. Section 7052 states that willing mutilation of, disinterment of, removal from a place of disinterment of, and sexual penetration of or sexual contact with any remains known to be human are felony offenses.

CALIFORNIA CODE OF REGULATIONS, SECTION 1427. California Code of Regulations, Section 1427 recognizes that California's archaeological resources are endangered by urban development and that these resources need preserving. This section establishes as a misdemeanor the willful injury, disfigurement, defacement, or destruction of any object or thing of archaeological or historical interest or value by someone who is not the owner, whether situated on private lands or within any public park or place. It also states that it is a misdemeanor to alter any archaeological evidence found in any cave, or to remove any materials from a cave.

PENAL CODE, TITLE 14, SECTION 622.5. This code establishes as a misdemeanor offense for any person, other than the owner, who willfully damages or destroys archaeological or historic features on public or privately owned land.

3.6.4. **Significance Criteria**

Historical resources are those cultural resources that are considered eligible or listed on the CRHR. Criteria for CRHR listing and eligibility are defined in PRC 5024.1 and CCR Title 14, Section 4850.3. Specifically, a resource may be eligible for the CRHR if it:

- Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
- Is associated with the lives of persons important in our past;
- Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
- Has yielded, or may be likely to yield, information important in prehistory or history.

If an archaeological resource does not fall within the definition of a historical resource, it may meet the definition of a "unique archaeological resource" (PRC 21083.2(g)). Unique archaeological resources include archaeological artifacts, objects, or sites that:

- Contain information needed to answer important scientific research questions and that there is a demonstrable public interest in that information;
- Have a special and particular quality such as being the oldest of its type or the best available example of its type; or

- Are directly associated with a scientifically recognized important prehistoric or historic event or person.

If an archaeological resource does not meet the definitions of a unique archaeological resource or of a historical resource, the effects of the project on those resources are not considered a significant effect on the environment (CEQA Guidelines (15064.5 (c)(4)).

Appendix C, Environmental Checklist Form, of CEQA addresses significance criteria with respect to cultural resources (PRC Sections 21000 et seq.). Under CEQA an impact on cultural resources would be considered significant if the proposed project would:

CUL-1 Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5;

CUL-2 Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5;

CUL-3 Directly or indirectly destroy a unique paleontological resource or unique geological feature; or

CUL-4 Disturb any human remains, including those interred outside of formal cemeteries.

3.6.5. Potential Impacts

3.6.5.1 Significance Criteria with No Impacts

CUL-3. Directly or indirectly destroy a unique paleontological resource or unique geological feature. No unique paleontological or geological resources are known to or expected to exist in the project area and no impacts to those resources would result.

3.6.5.2 Significance Criteria with Potential Impacts

CUL-1 CAUSE A SUBSTANTIAL ADVERSE CHANGE IN THE SIGNIFICANCE OF A HISTORICAL RESOURCE

Less than significant with mitigation for construction; no impact for operations

CUL-2 CAUSE A SUBSTANTIAL ADVERSE CHANGE IN THE SIGNIFICANCE OF AN ARCHAEOLOGICAL RESOURCE AS DEFINED IN SECTION 15064.5

Less than significant with mitigation for construction; no impact for operations.

CUL-4 DISTURB ANY HUMAN REMAINS, INCLUDING THOSE INTERRED OUTSIDE OF FORMAL CEMETERIES PURSUANT TO SECTION 15064.5

Less than significant with mitigation for construction; no impact for operations

Because the proposed project could encounter unidentified, subsurface archaeological/potential historical resources or human remains and known archaeological site CA-SCL-593 (P-43-000588) is considered both a unique archeological resource and a historical resource that contains human remains, the applicable significance criteria (CUL-1, CUL-2, and CUL-4) have been evaluated together.

CONSTRUCTION (ALL REACHES). Disturbance of native soils may cause substantial adverse changes in the significance of archaeological resources, identified and unidentified. These significant impacts may occur as a result of installation of coffer dams for dewatering, clearing and grubbing, excavation of the

channel, construction of floodwalls, compaction of soils, demolition of structures, and grading of access roads. Mechanical planting of seed vegetation and installation of TRM~~,~~ are anticipated to result in very minor soil disturbances.

Archaeological and geoarchaeological data suggest a moderate to high potential for exposing subsurface archaeological materials within the project area. This conclusion is based on the distribution of archaeological sites in the surrounding region and depositional processes along waterways. Construction disturbance along Berryessa Creek may result in impacts on unidentified, subsurface archaeological and potential historical resources. These may include human remains. Further, disturbance is proposed at known archaeological site CA-SCL-593, a known historical resource and archaeological resource~~, which includes human remains~~. Investigations performed to date include removal of the Native American human remains and associated artifacts from the site. However, it is possible that additional undiscovered cultural materials may remain at the historic site. Proposed disturbances in this area include excavation of the channel, clearing and grubbing of vegetation, and construction of flood control features. If construction activities were to damage cultural materials at this historic site, this impact would be significant.~~These impacts would be significant.~~

OPERATIONS (ALL REACHES). Additional maintenance would be required to inspect and maintain the floodwalls and the UPRR and Los Coches Creek culverts, overall maintenance needs, including excavation of sediments, would be reduced compared to current conditions. Banks would be more stable, and the general level of disturbance would be reduced compared to current conditions. Therefore, no impacts to cultural or historic resources, including human remains, would result from project maintenance and operations.

MITIGATION. Mitigation Measures CUL-A and CUL-B would reduce the potential for significant impacts on cultural resources and human remains during project construction. Measure CUL-A would require implementation of the MOA and HPMP described above following ~~consultation with the MLD~~ in order to mitigate impacts on historical and archaeological resource CA-SCL-593~~, as well as the human remains that have been identified within the site~~. Measure CUL-B requires archaeological monitoring during the construction phase of the project. Monitoring would be conducted under an Archaeological Monitoring and Unanticipated Discovery Plan, which would give the monitor authority to stop construction in the event of discovery of previously unidentified archaeological or paleontological resources or human remains, as well as any additional significant deposits at CA-SCL-593 that may not be identified as a result of implementation of the HPMP. This would reduce the potential for inadvertent significant impacts on cultural resources.

SIGNIFICANCE AFTER MITIGATION. Impacts associated with adverse changes to historical and archaeological resources, and disturbance of human remains would be less than significant after implementation of Mitigation Measures CUL-A and CUL-B because the MOA and HPMP for CA-SCL-593 contain measures to prevent a substantial adverse change in the significance of this site, and because an archeological monitoring and unanticipated discovery plan would prevent substantial adverse changes to the significance of undiscovered resources.

3.6.6. Mitigation Measures

CUL-A. IMPLEMENT THE MOA AND CA-SCL-593 HPMP. The District will work with the USACE to implement the following measures contained in the MOA between the USACE and the California SHPO. In accordance with stipulation 2 of the MOA which requires development of an HPMP, USACE prepared

an HPMP. Prior to and during construction of the proposed project, the HPMP will be implemented. The CA-SCL-593 HPMP (Stradford 2013) requires workforce training and archaeological monitoring of ground disturbing activities associated with the project.~~Prior to construction and in consultation with the MLD, the HPMP will be implemented. The CA-SCL-593-HPMP (Stradford 2013) outlines a testing phase for the overall site and a data recovery phase for the direct impact area, followed by workforce training and archaeological monitoring of ground disturbing activities associated with the project.~~

CUL-B. PREPARE AND IMPLEMENT AN ARCHAEOLOGICAL MONITORING AND UNANTICIPATED DISCOVERY PLAN. The District will work with the USACE to implement the following measures. Construction activities that involve ground disturbance will be monitored by a professional archaeologist. Archaeological monitoring protocols and standards for the project, including "halt work" areas surrounding unanticipated discoveries, will be documented in an Archaeological Monitoring and Unanticipated Discovery Plan, to be approved by the District, USACE, and UPRR~~, and the MLD~~ prior to construction. At a minimum, the plan will include:

- A cultural and archaeological context for the project and any unanticipated discoveries;
- Definitions of areas and depths to be monitored;
- Identification of archaeological resources;
- Protocols to be completed in the event of an unanticipated discovery, including notifications and assessment of the find's significance; and
- Protocols for treatment of human remains.

3.6.7. Statement of Impact

Table 3.17 summarizes potential impacts associated with cultural resources. Significant impacts associated with historical and archaeological resources and human remains may occur, but are considered to be less than significant after implementation of mitigation measures specified in Section 3.6.6.

Table 3.17 Statement of Impacts, Cultural Resources

Impact	Prior to Mitigation	Applicable Mitigation	After Mitigation
CUL-1. Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5.	S	CUL-A CUL-B	LM
CUL-2. Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5.	S	CUL-A CUL-B	LM
CUL-3. Directly or indirectly destroy a unique paleontological resource or unique geological feature.	NI	None	NI
CUL-4. Disturb any human remains, including those interred outside of formal cemeteries.	S	CUL-A CUL-B	LM
NI–No Impact, LS–Less than Significant, LM–Less than Significant with Mitigation, S–Significant, SU–Significant and Unavoidable			

3.7. GEOLOGY, SOILS, AND MINERAL RESOURCES

This section provides an overview of the geologic resources in the project area, including topography, soils, seismicity, and seismic hazards, such as liquefaction, landslides, ground shaking, and surface fault ruptures. The project area does not contain significant mineral, oil, or gas resource-producing areas. The project area has been classified by the California Division of Mines and Geology under the Surface

Mining and Reclamation Act of 1975 as not containing mineral resources; therefore, there would be no impacts to such resources and they are not discussed further in this ~~D~~EIR.

Appendix D presents the proposed project Geotechnical Report, which was used as a major source of information for this section.

3.7.1. Environmental Setting

The project area lies within the Coast Range geomorphic province of California, in the northern portion of the Santa Clara Valley, approximately 5 miles south of San Francisco Bay. Geologic features include the Santa Cruz Mountains to the west and the East Bay Hills/Diablo Range to the east. Movement of the San Andreas Fault west of the project area and the Hayward Fault to the east has created the structural depression of the Santa Clara Valley. The Diablo Range was formed by uplifting along the fault zone, while the valley down-faulted (City of Milpitas 2002).

3.7.2. Existing Conditions

3.7.2.1. *Geology*

The project area overlies Quaternary-age alluvium that has accumulated over the last few hundred thousand years. Specifically, the project area mapping units are identified as coarser-grained Holocene alluvial fan deposits (Qhf) and artificial stream channel (ac) (CGS 2004). Alluvium is the gravel, sand, or silt that deposits out of a flowing body of water, when that water reaches less sloping land and starts to slow. The area covered by Upper Berryessa Creek is characterized as an artificial channel (CGS 2004). There are no modern stream channel deposits or bedrock units reported in the area. Alluvial deposits are reported to be up to 2,785 feet thick, while artificial stream components are only 1 foot thick.

3.7.2.2. *Topography*

The ground elevation within the project area ranges from approximately 25 feet above Mean Sea Level (MSL) just downstream of Calaveras Boulevard to approximately 80 feet MSL at the intersection with I-680. This results in a stream slope of approximately 0.5 percent. The channel fluctuates in depth, where the overbank access road lies anywhere from 6 to 15 feet above the channel bed. Very little topographic variation occurs over the length of the stream, both within the channel bed, or along the access roads. The stream channel has been designed for flow conveyance and both the stream channel and access roads were designed to have uniformly engineered elevations.

3.7.2.3. *Soils*

Soil surveys within the channel and immediate vicinity report the following soils: Urbanland-Flaskan complex (140), Urbanland-Hangerone complex (145), Urbanland-Campbell complex (165), and Urbanland-Cropley complex (317) (NRCS 2013). Each of these soils is derived from alluvial fans and underlie areas of 70 percent or more urban development. Soil characteristics are described in Table 3.18.

Table 3.18 Characteristics of Soils within the Project Right of Way and Immediate Vicinity

Map Unit Symbol	Soil Complex	Slopes	Typical Profile
140	Urbanland-Flaskan	0-2%	Ap - 0 to 2 inches: sandy loam ABt - 2 to 7 inches: sandy clay loam

			Bt1 - 7 to 17 inches: gravelly sandy clay loam Bt2 - 17 to 31 inches: gravelly sandy clay loam C - 31 to 59 inches: very gravelly sandy loam
145	Urbanland-Hangerone	0-2%	A1 - 0 to 9 inches: clay A2 - 9 to 17 inches: clay Bw - 17 to 27 inches: clay Bk - 27 to 35 inches: clay Ck - 35 to 45 inches: clay loam C - 45 to 72 inches: gravelly loam 2Ab - 72 to 89 inches: clay
Map Unit Symbol	**Soil Complex**	**Slopes**	**Typical Profile**
165	Urbanland-Campbell	0-2%	Ap - 0 to 10 inches: silt loam A1 - 10 to 24 inches: silt loam A2 - 24 to 31 inches: silty clay loam A3 - 31 to 38 inches: silty clay loam 2A - 38 to 51 inches: silty clay loam 2Bw1 - 51 to 71 inches: silty clay 2Bw2 - 71 to 79 inches: silty clay
317	Urbanland-Cropley	0-2%	A1 - 0 to 4 inches: clay A2 - 4 to 11 inches: clay Bss1 - 11 to 24 inches: clay Bss2 - 24 to 33 inches: clay Bss3 - 33 to 51 inches: clay BCk1 - 51 to 57 inches: sandy clay loam BCk2 - 57 to 63 inches: sandy clay loam
Source: NRCS 2013.			

A report prepared in 2004, based on borings and geologic mapping, showed that soils have been highly altered within the project footprint as a result of development (Parikh Consultants, Inc. 2004). Native soils have been removed, highly disturbed, or otherwise changed by the process of development. Furthermore, the composition and consistency of alluvial soils varies laterally and vertically over small distances and depths (City of Milpitas 2002).

3.7.2.4. *EROSION*

Soil types found within the project area are relatively easily erodible, and evidence of erosion is found throughout the project area (Figure 3.11). Development of the watershed and confinement of the stream channel have caused extreme incision of the stream channel. Incision, in turn, creates steeper banks, which are easily undermined during high flow events. Bank hardening or erosion control efforts have been undertaken, but in many cases are not effective in stabilizing soils. In several locations within the project area (e.g., the confluence of Los Coches and Berryessa Creeks and the confluence of Piedmont and Berryessa Creeks), hardened banks have been undermined by incised channel flow. Bridge pilings and piers also show signs of undermining. Along access roads, cracks and fissures indicate areas where channel walls have the potential to slump or fall into the creek.

Left*: Crack or fissures that indicate potential slumps. Note erosion control matting to left of crack.* ***Top right****: bank hardening that has become undermined by a lowering channel invert and high flows.* ***Bottom right****: Erosion beneath bridge piers.*

Figure 3.11 Erosion, Reaches 1–3

3.7.2.5. *Seismicity*

Many earthquake faults exist in the San Francisco Bay area. Significant earthquakes that have occurred in this area are generally associated with crustal movements along well-defined active fault zones. Faults in the vicinity of the site with a moderate to high potential for surface rupture include the Hayward, Calaveras, San Andreas, Greenville, Silver Creek, and Concord-Green Valley Faults. Figure 3.12 presents the locations of the fault systems relative to the project area, and magnitudes of possible quakes are presented in Table 3.19.

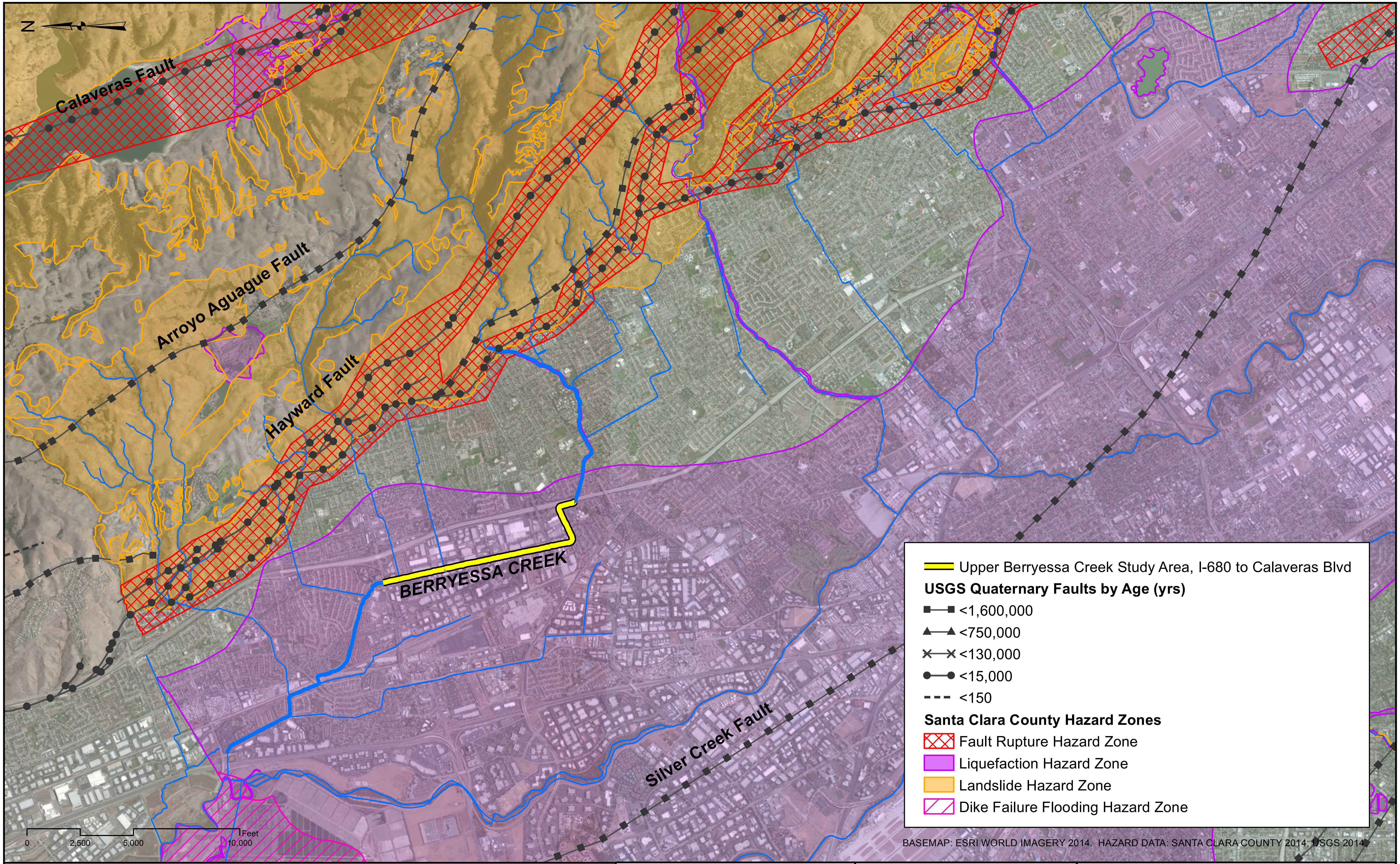

Figure 3.12 Seismic Hazard Zones

Tetra Tech
17885 Von Karman Avenue, Suite 500
Irvine, CA 92614
Tel. (949) 809-5000 Fax. (949) 809-5003

Santa Clara Valley Water District

UPPER BERRYESSA CREEK
FLOOD RISK MANAGEMENT PROJECT

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Active faults are classified as A to C for use under the California Building Standards Code. Classifications are based on the magnitude of earthquake typically associated with the fault and the fault's slip rate. Type A faults cause the greatest potential destruction, while Type C cause the least. The nearest active fault is Hayward, which runs beneath the City of Milpitas, but not directly beneath the project area.

Table 3.19 Maximum Credible Earthquake Magnitudes

Fault (Strike-Slip)	Estimated Miles from Project Area	Maximum Credible Earthquake	Fault Class[1]	Slip Rate (mm/yr)
Hayward	1.2	7.1	A	9
Calaveras	4.7	6.8	B	6
Silver Creek[2]	3	-	-	<2
San Andreas	15.6	7.8	A	17
Greenville	17.6	6.9	B	2
Concord-Green Valley	33.8	6.8	B	4-5

[1] Faults with an "A" classification are capable of producing large magnitude (M) events (M greater than 7.0), have a high rate of seismic activity (e.g., slip rates greater than 5 millimeters per year), and have well-constrained paleoseismic data (e.g., evidence of displacement within the last 700,000 years). Class B faults are those that lack paleoseismic data necessary to constrain the recurrence intervals of large-scale events. Faults with a "B" classification are capable of producing an event of M 6.5 or greater.

[2] Silver Creek fault is a potentially active fault. No historic seismicity has been recorded, though annual slip rate is estimated to be <2 mm.

Sources: Cao et al. 2003; Jennings 1994; Petersen et al. 1996; data compiled by USACE in 2011.

The study area is not located within an Alquist-Priolo Earthquake Fault Zone; therefore, the Alquist-Priolo Earthquake Fault Zoning Act does not apply to this project (California Geological Survey 2007). Furthermore, the City of Milpitas reports that the project area is not within an area where geotechnical studies are required prior to project approval (City of Milpitas 2002).

3.7.2.6. *Seismic Hazards*

LIQUEFACTION. Water-saturated sediment may become liquefied during earthquakes, resulting in loss of strength and failure that can cause damage to buildings, bridges and other structures. According to the California Department of Conservation Division of Mines and Geology, the project area falls within areas where historical occurrence of liquefaction, or where local geological, geotechnical and ground-water conditions indicate a potential for permanent ground displacement such that mitigation as defined in PRC Section 2693(c) would be required (2004).

Field investigations showed that depths to groundwater in the Milpitas Quadrangle ranged from 2.5 to 45 feet, with the study area having groundwater within 5 to 10 feet below the surface. According to a U.S. Geological Survey (USGS) liquefaction probability map, the project area has a 0 to 5 percent chance of liquefaction during a magnitude 7.8 earthquake along the San Andreas Fault (Holzer et al. 2008). The California Geologic Survey (CGS) gives a high potential rating for liquefaction to areas where Qhf deposits overlie shallow groundwater (less than 10 feet below the surface), which can be found in portions of the project area. The City of Milpitas reports that the project area is "Liquefaction – Prone" as opposed to "Very Highly Prone" or "Highly Prone" (2002). Additionally, geotechnical investigations reported in the Geotechnical Report (Tetra Tech 2015c) (Appendix D) indicate that the potential for liquefaction due to seismic shaking in the project area is low.

LANDSLIDES. Landslides triggered by earthquakes have been a significant cause of earthquake damage (CGS 2004). Areas more susceptible to landslides include steep slopes in unstable formations, areas underlain by loose, weak soils, and areas on or adjacent to existing landslide deposits. Based on field investigations and data reconnaissance, the CGS reports that the potential for landslides within the study area is very low. Alluvium and artificial stream channels fall into Group 3 for shear-strength, which on percent slopes between 0 and 15 percent is very low. Furthermore, no landslides have been reported in the project vicinity (CGS 2004), and as reported in the Geotechnical Report (Appendix D) the City of Milpitas does not include the project area in a landslide hazard area (2004). Localized bank failures within the Upper Berryessa Creek channel are likely due to high bank angles, but such failures do not constitute landslide hazards.

GROUND SHAKING. Hazards produced by earthquake-induced ground shaking include damage to structures and secondary ground failures. Intensity of ground shaking and potential damage depend on earthquake magnitude, distance to fault, depth to bedrock, physical characteristics of underlying soil and bedrock, and local topography. Maximum bedrock accelerations for Milpitas are expected to exceed 0.5g, half the acceleration of gravity (City of Milpitas 2002). Ground shaking that accompanied the 1868 earthquake on the Hayward Fault and the 1906 San Andreas Fault earthquake caused ground failure along Coyote Creek in Milpitas, resulting from ground settlement, lateral spreading, and failures of stream banks (City of Milpitas 2002). Large earthquakes on the Hayward Fault could create ground shaking ranging from "very violent" to "very strong" (City of Milpitas 2002).

SURFACE FAULT RUPTURE. No surface traces of any active or potentially active faults are known to pass directly through or project towards the site. Neither field exploration nor literature review disclosed an active fault trace in the project area. Therefore, the potential for surface rupture due to faulting occurring beneath the site during the design life of the proposed development is considered low (Tetra Tech 2015c).

3.7.3. Regulatory Setting

3.7.3.1. *State Regulations*

ALQUIST-PRIOLO EARTHQUAKE FAULT ZONING ACT. The State of California's Alquist-Priolo Earthquake Fault Zoning Act and California Building Code apply only to the construction of buildings designed for human occupancy, and therefore are not applicable to the proposed project.

SEISMIC HAZARDS MAPPING ACT. The Seismic Hazards Mapping Act of 1990 was developed to protect the public from the effects of strong ground-shaking, liquefaction, landslides, or other ground failure, and from other hazards caused by earthquakes. This act requires the State Geologist to delineate various seismic hazard zones and requires cities, counties, and other local permitting agencies to regulate certain development projects within these zones. The project area is located within a Seismic Hazard Zone for liquefaction, as designated by the CGS.

CALIFORNIA BUILDING CODE. The California Building Code (CBC), last updated in 2013, has been codified in the CCR as Title 24, Part 2. Title 24 is administered by the California Building Standards Commission, which by law is responsible for coordinating all building standards. Under California law, all building standards must be centralized in Title 24 or they are not enforceable. The purpose of the CBC is to establish minimum standards to safeguard the public health, safety, and general welfare through structural strength, means of egress from facilities, and general stability by regulating and controlling

the design, construction, quality of materials, use and occupancy, location, and maintenance of all building and structures within its jurisdiction. In addition, the CBC contains necessary California amendments based on the American Society of Civil Engineers' Minimum Design Standards 7-05, which provide requirements for general structural design and include means for determining earthquake loads as well as other loads (flood, snow, wind, etc.) for inclusion into building codes. The provisions of the CBC apply to the construction, alteration, movement, replacement, and demolition of every building or structure, or any appurtenances connected or attached to such buildings or structures throughout California.

Design and construction of the Upper Berryessa Creek channel would occur in accordance with appropriate design manuals and established design criteria to ensure stability under seismic events.

- Caltrans Seismic Design Criteria (2006). Caltrans seismic design criteria guides the construction of roadway infrastructure to withstand seismic risks.
- UPRR Design Standards.

3.7.3.2. *Local Plans and Policies*

MILPITAS GENERAL PLAN. The Seismic and Safety Element of the City of Milpitas General Plan (City of Milpitas 2002) identifies the following implementing policies that are applicable to the proposed project:

- 5.a-I-3: Require projects to comply with the guidelines prescribed in the City's Geotechnical Hazards Evaluation manual.

ENVISION SAN JOSE 2040 GENERAL PLAN. Protection of geologic resources within the City of San Jose includes:

- EC-4.5 Ensure that any development activity that requires grading does not impact adjacent properties, local creeks, and storm drainage systems by designing and building the site to drain properly and minimize erosion. Erosion Control Plans are required by the City of San Jose for any grading occurring between October 15 and April 15.

3.7.4. **Significance Criteria**

Based on State and local regulatory guidance, the proposed project would be considered to have a significant impact on geology or soils if it were to:

GEO-1 Expose people or structures to potential substantial adverse effects, including risk of loss, injury, or death involving:

a) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault,
b) Strong seismic ground shaking,
c) Seismic related ground failure including liquefaction, or
d) Landslides.

GEO-2 Result in substantial soil erosion or the loss of topsoil;

GEO-3 Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse;

GEO-4 Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code, creating substantial risks to life or property; or

GEO-5 Have soils incapable of adequately supporting the use of septic tanks or alternative waste disposal systems where sewers are not available for the disposal of wastewater.

3.7.5. Potential Impacts

Analysis of potential impacts related to geology, soils, and seismic concerns is based on review of the Geotechnical Report (Tetra Tech 2015c) (Appendix D), USGS reports, and previous investigations that have been performed to characterize substrate conditions in the project area.

3.7.5.1. *Significance Criteria with No Impacts*

The following significance criterion is not discussed further in the EIR because the proposed project would not result in impacts related to this criterion:

GEO-5 Have soils incapable of adequately supporting the use of septic tanks or alternative waste disposal systems where sewers are not available for the disposal of wastewater. The proposed project would not involve wastewater disposal using septic tanks or alternative waste disposal systems where soil capability would be an issue. The proposed treatment system for VOC-contaminated groundwater (if encountered at the JCI off-site area) would not discharge to soil and its functioning would not depend on soil conditions or characteristics.

3.7.5.2. *Significance Criteria with Potential Impacts*

GEO-1 EXPOSE PEOPLE OR STRUCTURES TO POTENTIAL SUBSTANTIAL ADVERSE EFFECTS, INCLUDING RISK OF LOSS, INJURY, OR DEATH INVOLVING SEISMIC GROUND-SHAKING OR LIQUEFACTION

Less than significant with mitigation for construction; no impact for operations

CONSTRUCTION (REACHES 1–3). Seismicity would not be altered as a result of construction. Potential risks to people or property would occur if new structures in which people would work or live, or which house significant resources, were built and which may fail during a seismic event. New structures that would be built under this alternative would be a new concrete culvert to replace the existing UPRR trestle, concrete aprons and transition structures, and the floodwalls. Culverts would also be installed at the mouths of Piedmont and Los Coches Creeks, but would be constructed of high-density polyethylene or HDPE culvert material, which would be unlikely to fail during an earthquake.

If failure of the floodwall occurred, it is unlikely to result in injury or death, given that it does not support occupied structures and is not likely to topple during an earthquake. Failure of the culvert at the existing UPRR trestle site during a large seismic event could result in loss, injury, or death. Therefore, this impact would be significant.

As stated in the project Geotechnical Report (see Appendix D), the proposed project is not located within an Alquist-Priolo earthquake fault zone; therefore, the risk of impacts from fault rupture is considered low. Also, there are no components of the proposed project that would alter seismic conditions and exacerbate the potential for fault rupture or that would expose humans or structures to fault rupture. Therefore, the potential effects are less than significant.

There are no aspects of the project that would increase liquefaction risks on a large scale. Although soils in the project area are prone to liquefaction, liquefaction risks are primarily associated with areas with a

high water table or otherwise wet soils, and very often associated with seismic activity. According to the project schedule, most construction would occur during dry weather, and construction areas would be dewatered. If liquefaction occurs, it would occur only on a localized level, generally where heavy machinery is operating over a shallow water table, in which case the main effects would be that equipment would need to be removed from that area, and different construction methods would need to be utilized. Because the potential effects would occur on a very small scale and would primarily affect the construction process itself, the risk of damage to property or harm to public health and safety is minimal. Furthermore, the project Geotechnical Report (see Appendix D) finds that the potential for liquefaction is not a geotechnical concern at this location and potential dynamic settlement at the site would not adversely affect the proposed improvements. Therefore, impacts associated with liquefaction are less than significant.

CONSTRUCTION (REACH 4). Potential impacts from ground shaking, fault rupture, and liquefaction are similar to those occurring in Reaches 1–3, and there would be no construction of structures that would create significant risk in the event of failure; therefore, impacts are less than significant in this reach.

OPERATIONS (ALL REACHES). Project-related operations and maintenance would not include actions that would increase the risks to life and property from ground shaking, fault rupture, or liquefaction; therefore, no impacts would result.

MITIGATION. Mitigation Measure GEO-A would ensure that designs of all proposed structures, including the proposed concrete box culvert at the existing UPRR trestle site, are prepared in accordance with seismic safety standards established by the State of California. Likewise, any utilities that are moved would be replaced in accordance with applicable seismic standards. Incorporating seismic safety standards into the project design would ensure that the potential for damage or loss of life during an earthquake would not increase as a result of the proposed project.

SIGNIFICANCE AFTER MITIGATION. Impacts would be less than significant upon implementation of Mitigation Measure GEO-A.

GEO-2 RESULT IN SUBSTANTIAL SOIL EROSION OR THE LOSS OF TOPSOIL

Less than significant with mitigation for construction; less than significant for operations

CONSTRUCTION (REACHES 1–3). Ground-disturbing activities during construction could result in soil erosion or loss of top soil in areas both within the channel and in the overbank areas. Under the proposed project, ground-disturbing activities or those that could otherwise contribute to erosion risk include:

- Demolition and excavation of concrete and earthen materials;
- Demolition of concrete paved channel bed and side slope protection features;
- Widening of channel bed and top of banks via excavation and grading of earthen material;
- Excavation of channel bed and side slopes for placement of rock revetment;
- Use of heavy equipment for hauling away of concrete debris and excavated material;
- Stockpiling of excavated materials or soils to be used for backfill; and
- Excavation for reconstruction of access roads.

Soils in the area will be disturbed during construction as a result of material excavation along the creek bed and banks, and during construction and use of access roads. A total of 74,500 cy would be

excavated from Reaches 1–3. Approximately 2,000 cy of these soils would be reused on-site, with most of the balance recycled off-site. All other materials would be disposed of at a permitted disposal facility.

Erosion may occur at staging areas, where initial grading to flatten the site, and subsequent disturbance by construction equipment would destabilize soils, leaving them vulnerable to erosion. Soils stockpiled for reuse or before they are hauled off for disposal would be especially vulnerable to erosive effects of wind and rain. As soils in the project area are relatively easily erodible, even soils that are stockpiled properly may erode as a result of rain or high winds. Impacts associated with excessive erosion include degraded water quality, excessive sedimentation and corresponding reduction in flow capacity, and fugitive dust. Erosion would be limited by performing construction actions during the dry months.

The District as landowner would be responsible for obtaining project coverage under the General Permit for Discharges of Stormwater from Construction Sites issued by the California State Water Resources Control Board. The General Permit conditions require that the applicant prepare and submit to SWRCB a stormwater pollution prevention plan (SWPPP) covering project construction. The SWPPP would include detailed measures to control erosion, contain sediments, and prevent turbidity and other forms of pollution from contaminating stormwater and being washed into drainages during construction. The SWPPP would be prepared by the construction contractor, and submitted to the SWRCB to obtain coverage under the Construction General Permit. The construction contractor would be required to implement the SWPPP during construction and would comply with the plan throughout the construction process. Measures from the SWPPP would be incorporated into the contractor's work plan and would be implemented prior to groundbreaking activities. Implementation of the SWPPP would minimize the amount of soil erosion or loss of topsoil during dry-season construction. Because substantial soil erosion would not occur, this impact would be less than significant.

The potential or soil erosion would be much greater during periods of substantial rainfall when the amount of water flowing in the creek would increase greatly. This could result in substantial erosion of disturbed and denuded work areas which would be particularly vulnerable to erosion during high creek flows. This impact would be significant.

CONSTRUCTION (REACH 4). Types of impacts would be similar to those for Reaches 1–3, although less excavation (15,500 cy) would occur**.** Loss of topsoil from off-site disposal is likely to be less than significant, as explained for Reaches 1–3. Implementation of the SWPPP would prevent soil erosion resulting from construction during the dry season and this impact would be less than significant.

The potential for soil erosion would be much greater during periods of substantial rainfall when the amount of water flowing in the creek would increase greatly. This could result in substantial erosion of disturbed and denuded work areas which would be particularly vulnerable to erosion during high creek flows. This impact would be significant.

OPERATIONS (ALL REACHES). The proposed project would increase maintenance and operations activities above the baseline by adding inspections and maintenance of floodwalls and the UPRR culvert. These activities would not affect geological, soil, or mineral resources.

MITIGATION. Significant soil erosion or loss of topsoil would be mitigated by implementing Mitigation Measure WAQ-C (Prepare and Implement a Rain Event Action Plan (REAP)).

SIGNIFICANCE AFTER MITIGATION. Mitigation Measure WAQ-C would mitigate soil erosion and loss of topsoil during substantial rain events by prescribing measures to stabilize soil at disturbed areas and prevent the washing of stockpiled material into waterways, reducing this impact to a less than significant level.

GEO-3 BE LOCATED ON A GEOLOGIC UNIT OR SOIL THAT IS UNSTABLE, OR THAT WOULD BECOME UNSTABLE AS A RESULT OF THE PROJECT, AND POTENTIALLY RESULT IN ON- OR OFF-SITE LANDSLIDE, LATERAL SPREADING, SUBSIDENCE, LIQUEFACTION, OR COLLAPSE

Less than significant for construction; no impact for operations

CONSTRUCTION (ALL REACHES). Unstable geological units are those that are prone to landslide, sloughing, or other types of slope failure. The proposed project is located in an area that is very flat, with slopes limited to the banks of the channel. Although localized bank failures could occur during construction if banks were undermined or weakened by top pressure from heavy construction equipment, such failure would be unlikely to affect human safety or the safety of property. In areas where steeper slopes of 1.5H:1V may result from construction, rock revetment would be keyed into the bank and/or the toe of the slope for stability, as recommended in the project Geotechnical Report (see Appendix D). Furthermore, the Geotechnical Report indicates that no project features would promote lateral spreading or subsidence. The proposed project, therefore, does not increase the risk of on- or off-site landslide, lateral spreading, subsidence, or slope failure, and this impact would be less than significant.

OPERATIONS (ALL REACHES). Channel banks would be less steep after project construction than under current conditions; therefore, the risk of bank failure would be reduced. Operations and maintenance actions have no potential to increase the risk of lateral spreading, liquefaction, or subsidence. There would be no impacts from operations and maintenance.

GEO-4 BE LOCATED ON EXPANSIVE SOIL, AS DEFINED IN TABLE 18-1-B OF THE UNIFORM BUILDING CODE, CREATING SUBSTANTIAL RISKS TO LIFE OR PROPERTY

Less than significant for construction; no impact for operations

CONSTRUCTION (ALL REACHES). Although expansive soils, as defined in Table 18-1-B of the Uniform Building Code, may occur in the project area, the Geotechnical Report (Appendix D) includes a comprehensive and detailed analysis of soils in the project area. The Geotechnical Report indicates that the soils to be excavated during project construction are suitable for the types of construction that would occur under the proposed project (Appendix D). This impact is less than significant.

OPERATIONS (ALL REACHES). Proposed operations and maintenance requirements would not create risks to life or property associated with expansive soils; therefore, no impacts would result.

3.7.6. Mitigation Measures

GEO-A. IMPLEMENT GEOTECHNICAL RECOMMENDATIONS. The District will work with the USACE to incorporate into project design recommendations of the project Geotechnical Report to minimize geological hazards. Recommendations from this report will guide design of foundations, earthwork, and site preparation. The recommendations shall become part of the construction specifications and be

consistent with standard engineering practice within California and CBC and be consistent with any local policies. Specific recommendations from the project Geotechnical Report (see Appendix D):

Site Preparation and Fill Placement

- The surface will be cleared of any topsoil, pavement, structures, vegetation, trash, and debris prior to commencement of any earthwork or foundation construction.
- Where new engineered fill will be placed on an existing slope, the fill will be supported by a shear key constructed at the base of the toe of slope. The key will extend to a minimum depth of 3 feet below existing grade, have a minimum bottom width of 5 feet, and side slopes of 1H:1V.
- Existing slopes to receive fill will be benched with 2-foot-high vertical cuts prior to fill placement. In order to adequately compact the face of fill slopes, fill slopes will be overbuilt by a foot or so and trimmed back to the final configuration.
- Fill will be placed in horizontal lifts not more than 8 inches in loose, uncompacted thickness.
- Soils excavated from the project site that are reused as compacted fill will be free of organics, deleterious materials, debris and particles over 3 inches in largest dimension. Locally, particles up to 4 inches in largest dimension may be incorporated in the fill soils. Wet soils will be spread, disked, and dried before they are reused for fill.

Shoring

- Sides of temporary excavations greater than 4 feet in depth will be sloped back at an inclination of 1:1 or flatter. Where space for sloped sides is lacking, the side slopes will be shored with cantilevered or anchored steel sheet pile walls.
- Shoring for the UPRR culvert will be designed based on the appropriate requirements in the American Railway Engineering and Maintenance Association Manual for Railway Engineering, Chapter 8.

Excavation and Construction Slopes

- Temporary and short-term excavations shallower than 4 feet may be excavated with vertical sides. Sides of temporary excavation deeper than 4 feet will be sloped back at an inclination of 1H:1V or flatter. Where space for sloped sides is not available, the slopes will be shored.
- Stockpiled (excavated) materials will be placed no closer to the edge of a trench excavation than a distance defined by a line drawn upward from the bottom of the trench at an inclination of 1H:1V, but no closer than 4 feet.
- In areas where excavation occurs below the groundwater level, temporary control and diversion of both surface water and groundwater seepage will occur.

3.7.7. **Statement of Impact**

As shown in Table 3.20, significant impacts associated with geology and soils would occur during construction. Implementation of mitigation measures described in Section 3.7.6 would reduce these effects to less than significant.

Table 3.20 Statement of Impacts, Geology, Soils, and Mineral Resources			
Impact	**Before Mitigation**	**Mitigation Measures**	**After Mitigation**
GEO-1. Expose people or structures to potential substantial adverse effects, including risk of loss, injury, or death involving: • Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault zoning map issued by the State Geologist for the area or based on other substantial evidence of a known fault; • Strong seismic ground shaking; • Seismic related ground failure including liquefaction; or • Landslides.	S	GEO-A	LM
GEO-2. Result in substantial soil erosion or the loss of topsoil.	S	WAQ-C	LM
GEO-3. Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse.	LS	None	LS
GEO-4. Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code, creating substantial risks to life or property.	LS	None	LS
Geo-5 Have soils incapable of adequately supporting the use of septic tanks or alternative waste disposal systems where sewers are not available for the disposal of wastewater.	NI	NI	NI
NI–No Impact, LS–Less than Significant, LM–Less than Significant with Mitigation, S–Significant, SU–Significant and Unavoidable			

3.8. GREENHOUSE GAS EMISSIONS AND ENERGY USE

This section reviews the definition and causes of climate change, and the potential for the alternatives to result in impacts to climate change. It identifies the stakeholders and regulatory agencies for regulating greenhouse gas (GHG) emissions in the project area, establishes thresholds for significant impacts, and evaluates those impacts for each alternative.

This section also assesses use of energy during construction and operations of the proposed project. Energy use is included in the GHG emissions section because wise and efficient use of energy is directly related to efforts to control GHG emissions and reduce the effects of climate change.

3.8.1. Environmental Setting

The rate of increase in global average surface temperature over the last hundred years has not been consistent; each of the last three decades has been successively warmer at the Earth's surface than any preceding decade since 1850 (IPCC 2013). The period from 1983 to 2012 was likely the warmest 30-year period of the last 1400 years in the Northern Hemisphere (IPCC 2013). During the same period over which this increased rate of global warming has occurred, additional changes have occurred in other natural systems: sea levels have risen on average 1.8 mm/yr; precipitation patterns throughout the world have shifted, with some areas becoming wetter and other drier; tropical cyclone activity in the North Atlantic has increased; peak runoff timing of many glacial and snow fed rivers has shifted earlier; as well as numerous other observed conditions. Though it is difficult to prove a definitive cause and effect relationship between global warming and other observed changes to natural systems, there is

high confidence in the scientific community that these changes are a direct result of increased global temperatures (IPCC 2013).

3.8.2. Existing Conditions

Maximum (daytime) and minimum (nighttime) temperatures are increasing almost everywhere in California but at different rates. The annual minimum temperature averaged over all of California has increased 0.33°F per decade during the period 1920 to 2003, while the average annual maximum temperature has increased 0.1°F per decade (Moser et al. 2009). With respect to California's water resources, the most significant impacts of global warming have been changes to the water cycle and sea level rise. Over the past century, the precipitation mix between snow and rain has shifted in favor of more rainfall and less snow (Mote et al. 2005; Knowles et al. 2006) and snowpack in the Sierra Nevada is melting earlier in the spring (Kapnick and Hall 2009). The average early spring snowpack in the Sierra Nevada has decreased by about 10 percent during the last century, a loss of 1.5 million acre-feet of snowpack storage (DWR 2008). These changes have significant implications for water supply, flooding, aquatic ecosystems, energy generation, and recreation throughout the State. During the same period, sea levels along California's coast rose 7 inches (DWR 2008).

Statewide GHG emissions in 2012 were approximately 4459 million metric tons of CO2e (carbon dioxide equivalent) (CARB 2014). Based on this estimate, statewide emissions would need to be reduced by approximately 32 million metric tons of CO2e by 2020 to meet the California Global Warming Solutions Act of 2006 (Assembly Bill 32, commonly referred to as AB 32) goal of achieving 1990 CO2e levels (427 million metric tons of CO2e) (CARB 2012a).

3.8.3. Regulatory Setting

3.8.3.1. *Federal Regulations*

Federal laws and regulations affecting GHG emissions include vehicle fuel economy standards under the Energy Policy and Conservation Act of 1975 (42 USC Section 62010 as well as EPA regulation of stationary source GHG emissions under the Clean Air Act (42 USC Section 7401 et seq.).

3.8.3.2. *State Regulations*

CALIFORNIA AIR RESOURCES BOARD. The CARB is responsible for the development, implementation, and enforcement of California's motor vehicle pollution control program, GHG statewide emission estimates and goals, and development and enforcement of GHG emission reduction rules. California is the second largest contributor of GHG in the U.S. and the sixteenth largest in the world (CEC 2006). During 1990 to 2003, California's gross state product grew 83 percent while GHG emissions grew 12 percent. While California has a high amount of GHG emissions, it has low emissions per capita. The major source of GHG in California is transportation, contributing 37 percent of the State's total GHG emissions (CEC 2006). The industrial sector accounted for approximately 22 percent of the total emissions. Electricity generation is the third largest generator, contributing 21 percent of the State's GHG emissions (CARB 2014).

California has taken proactive steps to address the issues associated with GHG emissions and climate change. A summary of the major California GHG regulations that would affect the project's GHG emissions is presented in Table 3.21.

Table 3.21 Summary of California Greenhouse Gas Regulations	
Bill, Year	**Description**
AB 1493, 2002	Requires CARB to develop and implement regulations to reduce automobile and light truck GHG emissions. These stricter emissions standards apply to automobiles and light trucks beginning with the 2009 MY. Although litigation was filed challenging these regulations and EPA initially denied California's related request for a waiver, the waiver request has now been granted.
Executive Order (E.O) S-3-05, 2005	The goal of E.O. S-3-05 is to reduce California's GHG emissions to: (1) year 2000 levels by 2010, (2) 1990 levels by 2020, and (3) 80 percent below the 1990 levels by 2050.
Bill, Year	**Description**
AB 32, California Global Warming Solutions Act of 2006	Sets overall GHG emissions reduction goals and mandates that CARB create a plan that includes market mechanisms and implement rules to achieve "real, quantifiable, cost-effective reductions of greenhouse gases." Requires statewide GHG emissions be reduced to 1990 levels by 2020. (The 1990 CO2e level is 427 million metric tons of CO2e (CARB 2012a). Directs CARB to develop and implement regulations to reduce statewide emissions from stationary sources. Specifies that regulations adopted in response to AB 1493 be used to address GHG emissions from vehicles. Requires CARB to adopt a quantified cap on GHG emissions representing 1990 emissions levels. Includes guidance to institute emissions reductions in an economically efficient manner and conditions to ensure that businesses and consumers are not unfairly affected by the reductions.
E.O. S-01-07, 2007	Requires the carbon intensity of California's transportation fuels to be reduced by at least 10 percent by 2020.
Senate Bill 97	This bill directed the Natural Resources Agency, in coordination with the Governor's Office of Planning Research, to address the issues through Amendments to the CEQA Guidelines. The revised Guidelines were adopted December 30, 2009 to provide direction to lead agencies about evaluating, quantifying, and mitigating a project's potential GHG emissions.
EO B-30-15, 2015	Establishes new interim state GHG reduction goal of 40 percent below 1990 levels by 2030.

3.8.3.3. *Bay Area Air Quality Management District*

The BAAQMD adopted thresholds and guidance in 2010 addressing the analysis of GHG emissions as well as other air pollutant emissions. The guidelines consist of two project-level thresholds for operational emissions, one for stationary sources (10,000 metric tons per year of CO2e) and one for projects with non-stationary sources (1,100 metric tons per year of CO2e; or 4.6 metric tons per service population per year of CO2e; or compliance with qualified GHG reduction strategies). Thresholds were not set for construction GHG emissions. As noted in the air quality regulatory setting, the BAAQMD CEQA thresholds are currently the subject of litigation before the Supreme Court, but the District has independently determined they are supported by substantial evidence.

3.8.3.4. *Sacramento Metropolitan Air Quality Management District (SMAQMD)*

Although the project is not located within SMAQMD boundaries, it has set a significance threshold for construction GHG emissions, and this threshold was used for this EIR. SMAQMD has established a threshold of 1,100 metric tons per yr (MT/yr) of CO_2 equivalent emissions for significant construction-phase GHG emissions, which is equal to 1,210 tons/yr.

3.8.3.5. *Local Plans and Policies*

CITY OF MILPITAS CLIMATE ACTION PLAN. The City of Milpitas adopted a Climate Action Plan in 2013. The plan objective is to streamline environmental review of future development projects consistent with CEQA and BAAQMD air quality guidelines. The plan includes a strategy, specific reduction measures, strategies for implementation, and a monitoring program to meet a 15 percent reduction from 2005 emissions of GHG by 2020 (one of three options outlined by BAAQMD). Goals are established in areas of energy, water, transportation, solid waste and off-road equipment. Goal 12 pertains directly to the proposed project:

- Goal 12: Support the expansion and use of clean technology off-road equipment.
- Measure 12.2: The City will encourage new development to comply with applicable BAAQMD best management practices that reduce GHGs, including use of alternative-fueled vehicles and equipment, use of local recycled materials, and recycling of construction or demolition materials. The City's goal is that 40 percent of construction equipment should comply with applicable best management practices.

CITY OF SAN JOSE GREENHOUSE GAS REDUCTION STRATEGY. Adopted in 2011, San Jose's Greenhouse Gas Reduction Strategy was developed in conjunction with Envision 2040, San Jose's Master Plan, and is designed to implement CEQA and BAAQMD air quality standards. Of three potential strategies outlined by BAAQMD, San Jose elected to establish a plan efficiency threshold of 6.6 metric tons of CO2 equivalent per service population (residents and workers) per year by 2020.

The strategy contains a number of implementation measures in such areas as the built environment, energy, land use, transportation, recycling, and waste reduction. While none of the specific measures specifically apply to the proposed project, waste reduction, recycling, and use of energy efficient construction equipment would generally apply.

SANTA CLARA COUNTY GENERAL PLAN. The Santa Clara County General Plan, Countywide Issues and Polices, include various policies to increase energy efficiency and resource conservation within Santa Clara County (Santa Clara County, 1994). The policies pertaining to energy efficiency and conservation can be summarized as follows:

- Energy efficiency and conservation efforts should occur across sectors/industries and be consistent with the state energy plan.
- Santa Clara County should reduce energy use and fossil fuel dependency in the transportation sector.
- Alternatives to nonrenewable energy sources should be integrated into building and structural design to the extent possible.

3.8.4. Significance Criteria

The proposed project would have a significant effect on GHG emissions and energy use if it would:

- **GHG-1** Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or
- **GHG-2** Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.
- **EN-1** Use energy in an inefficient, wasteful, or unnecessary manner.
- **EN-2** Result in an increased reliance on fossil fuels and decreased reliance on renewable energy sources.

3.8.5. Potential Impacts

GHG-1 GENERATE GHG EMISSIONS, EITHER DIRECTLY OR INDIRECTLY, THAT MAY HAVE A SIGNIFICANT IMPACT ON THE ENVIRONMENT

Significant and unavoidable for construction; less than significant for operations.

The project is primarily a construction project resulting in short-term, temporary GHG emissions from combustion associated with on- and off-road equipment. CO_2 is produced during the burning of fossil fuels and is the predominant GHG generated as a result of construction of the proposed project. Because no major sources exist for the other GHGs during the construction process, emissions of the other GHGs are not considered to be significant and no quantitative emission calculations were made for them. Project construction would result in a net increase of GHG emissions in the form of CO_2 over a finite period of one to two years.

CONSTRUCTION (ALL REACHES). CO_2 emissions from activities undertaken during construction were calculated by inputting construction-related data into the Sacramento Metropolitan Air Quality Management District's (SMAQMD) Road Construction Emissions Model, Version 7.1.5.1 (2013). Appendix B presents air quality model data sheets, which include CO_2 calculations.

CO_2 emissions from construction are estimated to be 1,110 tons in Reaches 1-3 and 928 tons in Reach 4 (Table 3.22). The BAAQMD does not have a threshold for GHG emissions during construction. The SMAQMD has established a threshold of 1,100 metric tons per yr (MT/yr) of CO_2 equivalent emissions for significant construction-phase GHG emissions, which is equal to 1,210 tons/yr. If project construction occurred over two years, the greatest amount of annual emissions would occur during the construction of improvements to Reaches 1 through 3. In that situation, the proposed project would generate CO_2 emissions of up to 1,110 tons/yr, which is below the SMAQMD significance threshold of 1,210 tons/yr. However, if the entire project (i.e. all four reaches) was constructed in one year, annual CO_2 emissions would be approximately 2,038 tons, exceeding the SMAQMD significance threshold, resulting in a significant impact.

Table 3.22 Project GHG Emissions					
Reaches Constructed During One Year	**Pollutant**	**Lbs. per day**	**Tons /Year**	**SMAQMD Project Construction Threshold (Tons/year)**	**Exceed Significance Threshold**
1 to 3	CO_2	12,526	1,110	1,210	No
4	CO_2	9,815	928	1,210	No
Reaches 1 to 4	CO_2	22,341	2,038	1,210	Yes

OPERATIONS (ALL REACHES). The proposed project would increase maintenance and operations activities above the baseline by adding inspections and maintenance of floodwalls and the UPRR culvert. The expected increase in vehicle trips would be less than one per month, which would result in far less emissions of greenhouse gases than the SMAQMD significance threshold of 1,210 tons/year. This impact would be less than significant.

MITIGATION. Implementation of Mitigation Measures AIR-A and AIR-B, which are intended to reduce NOx emissions (see Sections 3.3.5 and 3.3.6), would also reduce GHG emissions by up to 20 percent. These measures would reduce the amount of fossil fuels consumed in the construction phase by eliminating unnecessary idling of equipment and ensuring equipment is in good condition and properly maintained to manufacturers specifications.

SIGNIFCANCE AFTER MITIGATION. The proposed mitigation measures would reduce construction-period emissions of CO_2 by up to 20 percent but would not reduce CO_2 emissions below the significance threshold if construction is completed in one year. As a result, this impact would be significant and unavoidable.

GHG-2 CONFLICT WITH AN APPLICABLE PLAN, POLICY, OR REGULATION ADOPTED FOR THE PURPOSE OF REDUCING THE EMISSIONS OF GREENHOUSE GASES

Less than significant for construction; less than significant for operations

CONSTRUCTION (ALL REACHES). The proposed project is compliant with Goal 12 of City of Milpitas Climate Action Plan in that many of the construction or demolition materials would be recycled, and most materials are locally sourced. Although the City of San Jose's Greenhouse Gas Reduction Strategy does not apply specifically to this type of project, the proposed project is still consistent with its recommended measures to reduce wastes, recycle materials and use recycled materials, and energy efficient construction equipment. Therefore, the proposed project would not conflict with local GHG reduction policies.

The proposed project would not interfere with the State's ability to achieve the AB 32 Scoping Plan because construction GHGs would be negligible compared to statewide emissions. Thus the project would not substantially interfere with the State's ability to achieve the AB 32 GHG emissions reduction target of 1990 emissions by 2020. This impact would be less than significant.

OPERATIONS (ALL REACHES). The proposed project would increase maintenance and operations activities above the baseline by adding inspections and maintenance of floodwalls and the UPRR culverts. The expected increase in vehicle trips would be less than one per month, which would result in negligible emissions of GHGs. This impact would be less than significant.

EN-1 USE ENERGY IN AN INEFFICIENT, WASTEFUL, OR UNNECESSARY MANNER,

Less than significant for construction; less than significant for operations

And,

EN-2 RESULT IN AN INCREASED RELIANCE ON FOSSIL FUELS AND DECREASED RELIANCE ON RENEWABLE ENERGY SOURCES.

Less than significant for construction; less than significant for operations

CONSTRUCTION (ALL REACHES). Construction of the proposed project would result in the use of energy during construction. Fossil fuels would be used to power construction machinery, haul trucks, and machinery used in the disposal of construction debris. In general, the construction contractor would use efficient machinery and would maintain equipment to use the least amount of energy possible. Also, having multiple staging areas would reduce the length of vehicle trips to and from the active construction location. A local labor force would be employed to reduce the vehicle miles traveled to and from the construction area during the daily commute. Additionally, construction activities would not result in long-term consumption of petroleum-based energy resources and would not permanently increase reliance on petroleum based resources. Construction impacts on energy efficiency and use, in particular petroleum-based energy resources associated with transportation, would be less than significant.

Although electricity would be consumed for lighting, electric signs and safety equipment, and for use of power tools, the amount that would be used would be the minimum needed to power equipment, and would be relatively minimal. Electricity demand for construction would not permanently increase reliance on energy resources that are not renewable. Construction impacts on energy efficiency and use, in particular electricity resources, would be less than significant.

OPERATIONS (ALL REACHES). Although additional maintenance and operations activities may be needed to inspect and maintain the floodwalls and the UPRR culverts, excavation of sediments in the channel is likely to decrease as the reconstruction would be designed to pass sediments through more efficiently. Therefore, net use of energy during maintenance and operations is likely to decrease relative to baseline conditions.

MITIGATION (NOT REQUIRED). Although Impacts EN-1 and EN-2 would be less than significant, implementation of Mitigation Measures AIR-A and AIR-B would further ensure that fuel energy consumed in the construction phase would not be wasted through unnecessary idling or through the operation of poorly maintained equipment. These mitigation measures would also ensure that equipment is in good condition and maintained to manufacturers specifications to maintain fuel efficiency and ensure that equipment not being used would be shut off.

3.8.6. Statement of Impact

As shown in Table 3.23, impacts associated with greenhouse gas emissions would be significant and unavoidable, and impacts associated with energy use would be less than significant. Mitigation measures designed to reduce air quality impacts would increase efficient use of energy during construction.

Table 3.23 Statement of Impacts, Greenhouse Gases and Energy Use

Impact	Prior to Mitigation	Applicable Mitigation	After Mitigation
GHG-1. Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment	S	AIR-A AIR-B	SU
GHG-2. Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases	LS	AIR-A AIR-B	LS
EN-1. Use energy in an inefficient, wasteful, or unnecessary manner.	LS	AIR-A AIR-B	LS
EN-2. Result in an increased reliance on fossil fuels and decreased reliance on renewable energy sources.	LS	None	LS
NI–No Impact, LS–Less than Significant, LM–Less than Significant with Mitigation, S–Significant, SU–Significant and Unavoidable			

3.9. HAZARDOUS MATERIALS

This section describes hazardous materials that are known to exist or which may exist within the study area, and provides an evaluation of possible adverse effects regarding hazardous materials associated with implementing the proposed Upper Berryessa Creek Flood Risk Management Project. Appendix E contains the proposed project's Hazardous, Toxic, and Radioactive Waste report, which was used as the primary source of information for this section.

3.9.1. Environmental Setting

The term "hazardous materials" in this analysis refers to both hazardous substances and hazardous wastes. Under Federal and State laws, any material, including wastes, may be considered hazardous if it is specifically listed by statute as such or if it is toxic (causes adverse human health effects), ignitable (has the ability to burn), corrosive (causes severe burns or damage to materials), or reactive (causes explosions or generates toxic gases). According to the California Health and Safety Code (sec. 25501 (o)), a hazardous material is defined as "any material that, because of quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment".

3.9.2. Existing Conditions

Beginning in the mid-twentieth century, the land uses along the 2.2-mile reach of Upper Berryessa Creek under study changed from mainly agricultural to light industrial and commercial. During the last 50 or more years, several incidents involving hazardous materials have occurred along this reach, including leaking underground and above-ground storage tanks, spills, and ineffective practices of using and

storing hazardous materials. However, it appears from available information reviewed for this EIR that most of these incidents have been remediated and are now considered by regulatory agencies to be “closed cases”, with the exception of the following seven sites (all in Milpitas):

- The Former Great Western Chemical Company Site (Great Western Site), 945 Ames Avenue;
- The Former Jones Chemicals, Inc. Site (JCI Site), 985 Montague Expressway;
- Penske Truck Leasing, 1039 Montague Expressway;
- North American Transformer, 1200 Piper Drive;
- Linear Technology Corporation, 275 S. Hillview Drive;
- Lite-on, 720 S. Hillview Drive; and
- DISC Stampers, 1103 Montague Court.

The locations of these sites are shown in Figure 3.13. Based on a review of information pertaining to these sites, Great Western and Jones Chemical have had considerably greater number and level of hazardous materials incidents compared to the other five sites. Also, both of these sites are documented to be sources of prior volatile organic compound releases to soil and groundwater, and are located hydraulically upgradient from the project area. Groundwater beneath both sites flows westerly such that the respective groundwater plumes cross the project area as shown on Figure 3.13. Additional information about these sites is provided below.

3.9.2.1. *Great Western*

BACKGROUND. The Great Western Site was a chemical depot and distribution business in operation between the late 1950s and the mid-1980s. Past operations included chemical storage in four 6,000-gallon and other smaller above-ground storage tanks (ASTs), and eight 7,500-gallon underground storage tanks (USTs). Other components included a drum storage area, an acid-packaging area and sump, a vehicle fueling island with USTs containing diesel and gasoline, and an above-ground propane tank. The ASTs were removed in 1984 and 1985, and the USTs were removed in 1989. The sump was removed in 2001 (PEI 2012).

Initial investigations conducted in 1982 by the SFBRWQCB revealed, and additional investigations in subsequent years have confirmed, that VOCs, including trichloroethylene (TCE), 1, 1, 1-trichloroethane (TCA), and tetrachloroethylene (PCE), as well as aromatics and petroleum hydrocarbons, were released into the soil and groundwater underlying the Great Western Site during its operations. In a report on a Phase II investigation conducted for the District in 1996, Kennedy-Jenks (1996) included a figure that indicated a “plume” of VOC contamination emanating from the Great Western Site, which has been used for this FEIR analysis.

SITE HYDROGEOLOGY. Sediments underlying the Great Western Site (down to depths greater than 100 feet) are mainly composed of alluvial deposits of silts and clays with intermittent silty sand and gravel lenses (PEI 2013). These lenses, which may be expected to provide a flow pathway for groundwater, are only about 3 feet thick at most, and are not considered to be laterally continuous. The sediments underlying the site have been divided into three vertical zones: a shallow zone to less than 40 feet below ground surface (bgs), an intermediate zone between 40 and 65 feet bgs, and a deep zone with depths beyond 65 feet bgs. A dense contiguous clay layer appears at about 60 feet bgs, and this clay layer has been considered the lower boundary of groundwater flow underlying the Great Western Site.

Groundwater flow direction is generally west-northwest under a hydraulic gradient of approximately 0.0052 feet per feet (foot) in the shallow zone, and approximately 0.0071 foot in the intermediate zone. Also, in general, an upward vertical gradient has been observed between the intermediate and shallow zones (PEI 2013).

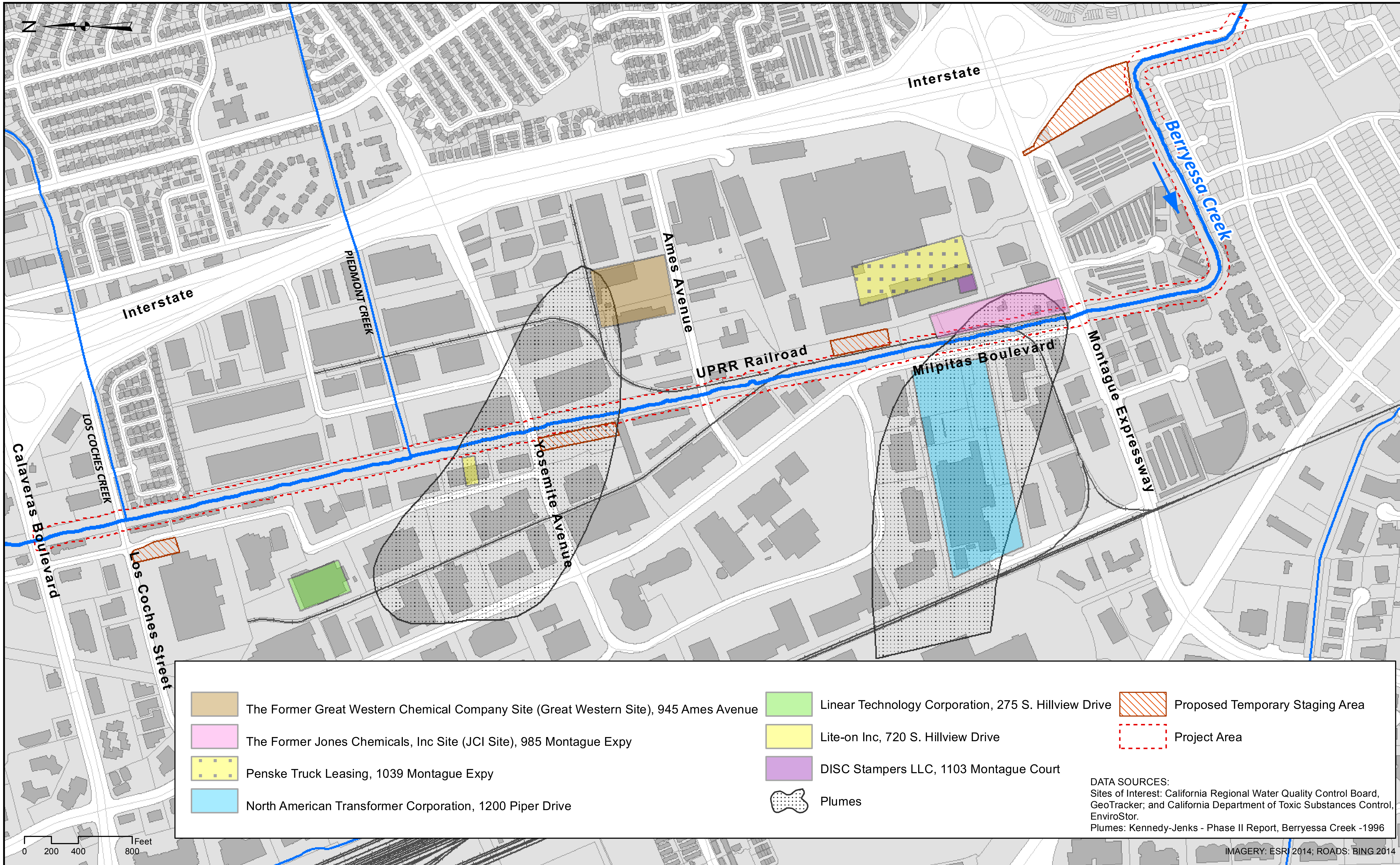

Figure 3.13 Hazardous Waste Sites

Tetra Tech
17885 Von Karman Avenue, Suite 500
Irvine, CA 92614
Tel. (949) 809-5000 Fax. (949) 809-5003

Santa Clara Valley Water District

UPPER BERRYESSA CREEK
FLOOD RISK MANAGEMENT PROJECT

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REMEDIATION HISTORY AND STATUS. Based on the sources and nature of contamination at the Great Western Site and the hydrogeological characteristics of the underlying strata revealed by investigations, the Great Western Site remediation activities have been conducted in two areas: an "On-Site Area," which comprises the source location, and an "Off-Site Area," which comprises a larger area made up of the plume downslope of the source location These two areas have been divided into four operable units based on somewhat distinct groundwater zones defined as follows:

- Operable Unit On-site Shallow Groundwater Zone (On-site SGZ), to a depth of 40 feet bgs;
- Operable Unit On-site Intermediate Groundwater Zone (On-site IGZ), at a depth between 40 and 70 feet bgs;
- Operable Unit Off-site SGZ, again to a depth of 40 feet bgs; and
- Operable Unit Off-site IGZ, again at a depth between 40-70 feet bgs.

As can be seen in Figure 3.13, Upper Berryessa Creek crosses the plume in the Off-Site Area of the Great Western Site.

Remediation investigations conducted in the On-Site and Off-Site Areas of the Great Western Site indicate that contamination found in the On-Site operable units is associated with source zones identified in the On-Site Area (e.g., former locations of USTs and ASTs). By comparison, the contamination found in the Off-Site Area is mainly associated with contaminants that have migrated as a plume from On-Site source zones (PEI 2012).

Based on this, the remediation actions conducted over the years in the four operable units have focused on improving groundwater quality and controlling and reducing off-site migration of impacted groundwater from the on-site source zones. Following removal of the primary on-site sources, the remedial actions have relied on the use of a groundwater extraction and treatment system (GWETS), which was in operation between 1986 and 2006. This system was replaced in 2007 by an enhanced reduction dechlorination (ERD) system, still operating at present (2014).

Associated with the operation of these treatment systems has been the installation and ongoing use of numerous extraction, injection, and monitoring wells in the On-Site and Off-Site Areas. Groundwater levels have also been periodically monitored in selected wells for both the On-Site and Off-Site Areas. Initial and ongoing investigations and monitoring have found that accidental releases and operational procedures during the life of the Great Western Facility have resulted in high concentrations of VOCs in a groundwater plume under both the On-Site Area and Off-Site Area. Twenty-four monitoring wells were accessed during these investigations. Average depth to groundwater was found to be 7.20 feet, with the shallowest depth found at 4.10 feet and the greatest depth at 11.35 feet.

The concentrations of VOCs in the groundwater have been greatly reduced over time as a result of the ongoing remediation efforts, although several monitoring wells are still measuring VOCs above Environmental Screening Levels (ESLs) set by the EPA.

Based on the positive results achieved by the ERD system in reducing VOC levels particularly in Operable Unit Off-site SGZ, a proposal was submitted to the SFBRWQCB in April 2012 by Pristine Earth, Inc. (PEI 2012) on behalf of the current landowner of the Great Western Site (McCall Oil and Chemical Corporation). The proposal was to close further remediation efforts in Operable Unit Off-site SGZ, and destroy the wells associated with the remediation and monitoring of that Operable Unit. The SFBRWQCB approved the proposal in October 2012 (SFBRWQCB 2012), and this closure was completed by the end of 2012. Although remedial efforts have ceased in Operable Unit Off-site SGZ, the other three

zones still have active VOC contamination remediation taking place, and there is migration potential between zones.

3.9.2.2. *Jones Chemical Incorporated Site*

BACKGROUND. The Jones Chemical Incorporated (JCI) site was also a chemical storage and distribution business, in operation between the early 1960s and the late 1990s. The JCI site routinely received and stored chlorine gas, sulfur dioxide, anhydrous ammonia, various acids and bases, as well as TCA. Upper Berryessa Creek is located about 50 feet down-gradient from the western JCI Site boundary (see Figure 3.13.)

In early February 1982, an above-ground storage tank on the JCI Site exploded and released up to 4,000 gallons of chlorinated solvents into the ground and to Upper Berryessa Creek via a storm drain. Initial cleanup of the spill involved pumping and disposing of liquid from the storm drain and creek, and removing about 280 cubic yards of sediment from the creek bed. The RWQCB commissioned initial investigations following the spill, and has since been overseeing additional investigations, as well as remediation actions and monitoring in order to clean up contaminated soils and groundwater originating from the JCI Site spill and operations. In a report on a Phase II investigation conducted for the District in 1996, Kennedy-Jenks (1996) included a figure that indicated a "plume" of VOC contamination emanating from the JCI site. This figure has been used for this analysis.

Subsurface investigations and ongoing remediation measures have taken place within an "On-Site Area" (the former JCI site), and within four down-gradient off-site areas to the west and northwest collectively referred to as the "Off-Site Area".

SITE HYDROGEOLOGY. Sediments underlying the On-Site Area and the Off-Site Area are mainly composed of inter-bedded alluvial deposits of silts, sands, gravels, and clays. The upper 10 feet of sediments are a mixture of sand, gravel, and gravelly clay deposits. These are underlain by another 10-foot layer of clay, with silty and sandy clays and small amounts of sand and gravel. Interspersed within this upper 20 feet of sediment, there are numerous small beds and lenses of sand, up to a foot thick. Ongoing monitoring, investigations, and remedial actions associated with the On-Site and Off-Site Areas have recognized two vertical permeable zones as transmitting pollutants: a shallow zone to 40 feet bgs and an intermediate zone between 40 and 70 feet bgs. Hydraulic conductivities in these permeable zones are high enough (up to $5x10^{-4}$ cm/sec) to transmit pollutants. Groundwater elevation measurements indicate a westward flow direction in the shallow and intermediate groundwater zones (RWQCB 1990; Arcadis 2014a).

REMEDIATION ACTIONS AND STATUS. From the initial and ongoing investigations and monitoring it has been determined that the groundwater in the permeable zones (shallow and intermediate) underlying the On-Site Area and the down-gradient Off-Site Area to the west and northwest have been polluted by a groundwater plume containing several chlorinated solvents (VOCs), with the major ones being TCE, TCA, PCE, dichloroethene (DCE), and dichloroethane (DCA). On this basis, ongoing remediation actions, monitoring, and investigations have been conducted in both the On-Site and Off-Site Areas, focused on improving groundwater quality and controlling and reducing the migration of affected groundwater. Associated with the remediation actions has been the installation and ongoing use of numerous extraction, injection, and monitoring wells in the On-Site and Off-Site Areas. Groundwater levels have also been periodically monitored in selected wells at both the On-Site and Off-Site Areas. The remediation actions are summarized below.

ON-SITE AREA. Following initial investigations and monitoring on-site between 1982 and 1984, a GWETS was established and operated between 1986 and 2002, when it became inoperable due to vandalism. The GWETS was replaced with a carbohydrate injection system, which was initially cheese whey and then replaced with emulsified soybean oil substrate. Based on the analytical results of groundwater samples collected as of June 2010, ongoing injection of the substrate in the On-Site Area was terminated in mid-2010 (Arcadis 2014a).

OFF-SITE AREA. Remedial investigations to assess the lateral and vertical distribution of contaminants in the groundwater in the Off-Site Area began in 1984, and characterization was completed in 1987. As a result the GWETS was expanded to the Off-Site Area to help control VOC migration off-site. By 2003, the GWETS off-site had been replaced with the cheese-whey injection system, with emulsified soybean oil substrate later replacing cheese-whey to accelerate the cleanup of VOCs. Based on the analytical results of groundwater samples collected as of June 2010, ongoing injection of substrate in the Off-Site Area was terminated in mid-2010 (Arcadis 2014a).

In 2009, at the request of the SFBRWQCB to further assess potential health risks in the Off-Site Area, several soil vapor sampling points were established in the Off-Site Area at depths of 5 feet and 10 feet bgs. In July 2009, samples were taken and analyzed for VOCs at these locations (LFR 2009). In March 2014, the SFBRWQCB requested another round of VOC soil vapor samples be taken at the Off-Site Area sampling points, with additional points established as necessary to replace missing or unavailable sampling points. This request was made to obtain updated data on concentrations of soil vapor in the Off-Site Area in order to assess mitigation measures being designed for planned residential development in a portion of the Off-Site Area west of the JCI Site (RWQCB 2014).

SAMPLING AND MONITORING RESULTS. As can be seen in Figure 3.13, Upper Berryessa Creek crosses the groundwater contamination plume between the On-Site and Off-Site portions of the JCI Site. Because excavation depths associated with the proposed project are likely not to exceed 15 feet bgs, and the construction zone is mainly 50 feet on each side of the creek, the assessment in this EIR of potential adverse effects from groundwater contamination associated with the JCI Site focuses primarily on data on groundwater quality and levels and VOC soil vapor data near the creek and within the shallow groundwater zone (less than 40 feet bgs).

Figures in the Geotechnical Report (Appendix D) show the locations of wells in the vicinity of Upper Berryessa Creek, with accompanying meta-data on VOC concentration levels sampled in 2009 and 2013. Twenty groundwater wells were accessed at this site, with the average depth to groundwater being 12.12 feet. The shallowest depth to groundwater was 9.31 feet, and the greatest depth to groundwater was 13.35 feet. The concentrations of VOCs in the groundwater have been greatly reduced over time as a result of the ongoing remediation efforts, although some monitoring wells are still measuring VOCs above ESLs.

To further characterize the extent of possible contamination in the JCI plume area, soil samples were obtained and sampled in December 2014 (Tetra Tech, 2015d). These investigations occurred in the vicinity of the plumes to determine whether any contamination exists in the underlying soils.

In-situ soil samples were taken along the Berryessa Creek access road in proximity to the JCI plume and the Great Western plume. The in-situ soil samples were obtained by advancing soil borings with a truck-mounted, direct push bore coring rig, resulting in 2-to-4-inch diameter soil samples.

A summary of the findings is as follows:

- The VOC concentrations detected in the upper 15 feet of soil are below risk-based screening criteria applied by the SFRWQCB and the EPA. The report concludes that the reuse of the soils would not present an unacceptable human health or environmental risk, and therefore would be appropriate.
- Soil transported off-site for disposal would be classified as non-hazardous.
- Dewatering, if necessary, would require treatment prior to discharge.

3.9.2.3. *Penske Truck Leasing Site*

The Penske Truck Leasing Site (Penske Site) was operated as a fleet rental, servicing, repair, and fueling operations facility until September 2003. Former features at the Penske Site included two 20,000-gallon diesel fuel USTs, one 500-gallon waste oil AST, one 1,500-gallon new oil AST, and four dispenser islands. All of these features were removed in 2003. Soil testing at the Penske Site taken at the time, and groundwater samples taken in 2004, indicated the presence of TPH-d and TPH-g in the soil and groundwater that were above ESLs. Upper Berryessa Creek is located approximately 500 feet west and down-gradient of the removed features (see Figure 3.13).

In June 2014, the Santa Clara Department of Environmental Health (DEH) determined that the RWQCB's Low Threat UST Case Closure Policy criteria had not been met (Arcadis 2014c). Reasons stated by the DEH include:

- Some sources of contamination remain unidentified;
- The extent of the TPH-d and TPH-g plume has not been defined;
- Soils in some areas on the site were not over-excavated and remain in place; and
- No soil-gas samples have been collected and an adequate bioattenuation zone has not been determined.

On this basis, the DEH requested that Penske prepare a Work Plan to prepare a Site Assessment Report that addresses the impediments to closure of the site under the Low Threat UST Case Closure Policy. In September 2014, the DEH accepted the proposed Work Plan, and requested that the Site Assessment Report be submitted by January 9, 2015. The site assessment report was submitted to SFBRWQCB in February 2015, and indicated that because only very localized, low concentrations of chlorinated organic compounds remained in the groundwater, no further action is recommended at the site (Arcadis 2015).

3.9.2.4. *North American Transformer Site*

This North American Transformer Site (NAT Site) was used as a manufacturing, testing, and repair facility for electrical transformers from about 1958 to 2002. The NAT Site is located about 1,200 feet west and down-gradient of Upper Berryessa Creek (see Figure 3.13). Several environmental investigations at the NAT Site since 1989 have shown that soil at the site was contaminated, primarily with transformer oil, chromium, PCBs, TCE, PCE, and TCA. Under the oversight of the RWQCB, hazardous substances in the soil at the site have been remediated to RWQCB standards. This included the removal and off-site disposal of more than 5,000 tons of impacted soil. However, in 2005, an environmental restriction was placed on the property title of the NAT Site because it was determined that the shallow groundwater under the site was contaminated with VOCs (Waukesha 2005). The groundwater contamination was attributed to the 1982 release of VOCs from the former JCI Site, located just east and up-gradient from

the NAT Site. Remediation efforts to bring VOCs in the groundwater under the NAT Site to within acceptable ESLs are ongoing, through the efforts of the JCI Site, and with the oversight of the RWQCB.

3.9.2.5. *Linear Technology Corporation Site*

Information on this site is marginal. The site is located about 500 feet west and down-gradient from Upper Berryessa Creek (see Figure 3.13). The RWQCB GeoTracker database does not have any data or information on the site. The ENVIROSTOR database of the California Department of Toxic Substances Control (DTSC) lists the cleanup status of the site as “Inactive – Needs Evaluation,” and indicates that the site has a tiered NPDES Permit: N0. CAS 00001, with a Site Code: 71002830.

3.9.2.6. *Lite-On Inc. Site*

Information on this site is also marginal. The site is located about 100 feet west and adjacent to Upper Berryessa Creek (see Figure 3.13). The RWQCB GeoTracker database does not have any data or information on the site. The ENVIROSTOR database of the DTSC lists the cleanup status of the site as “Inactive – Needs Evaluation,” with a Site Code: 71002704.

3.9.2.7. *DISC Stampers LLC Site*

Information on this site is also marginal. The site is located about 500 feet west and up-gradient from Upper Berryessa Creek, in the same vicinity as the Penske Site (see Figure 3.13). The RWQCB GeoTracker database does not have any data or information on the site. The ENVIROSTOR database of the DTSC lists the cleanup status of the site as “Inactive – Needs Evaluation, as of 9/16/2013,” with a Site Code: 71004121.

3.9.2.8. *Airports and Sensitive Receptors*

AIRPORTS IN PROJECT VICINITY. The nearest public airport to the project area is the Norman Y. Mineta San José International Airport, located about 4 miles southwest of the project in the City of San José. The Moffett Federal Airfield is located approximately 8 miles west of the project area. The Reid-Hillview Santa Clara County Airport is located approximately 9 miles south-southeast of the project area. There are no private airfields in the project vicinity.

SENSITIVE RECEPTORS IN PROJECT VICINITY. The nearest school to the project area is Northwood Elementary School, located about 700 feet south of the project area. The Milpitas Christian Preschool is located approximately 0.6 mile northeast. Pinewood Park is located approximately 1 mile west of the project area. Residential developments are found at The Crossing at Montague Apartments, located about 800 feet south of the edge of the JCI plume, and adjacent to Los Coches Creek, located approximately 1,600 feet north of the edge of the Great Western plume.

3.9.3. **Regulatory Setting**

Hazardous materials and hazardous wastes are subject to numerous Federal, State and local laws and regulations intended to protect public health and safety and the environment. These laws and regulations require that proposed projects include detailed planning and management to ensure that hazardous materials are properly handled, used, stored, and disposed of and, in the event that such materials are accidentally released, to reduce risks to human health and the environment.

The EPA, CEPA, DTSC, SFBRWQCB, and BAAQMD are the major Federal, State, and regional agencies that enforce hazardous, toxic, and radioactive waste (HTRW) regulations.

The main focus of the Federal Occupational Safety and Health Administration (Fed-OSHA) and the California Occupational Safety and Health Administration (Cal-OSHA) is to prevent work-related injuries and illnesses, including from exposures to hazardous materials. CAL-FIRE is the State agency that implements fire safety regulations.

3.9.3.1. *Soil and Groundwater Contamination*

CA Government Code § 65962.5 (Cortese List)

Government Code § 65962.5 was originally enacted in 1985, and requires the California DTSC to compile, update, and submit to Cal EPA annually a list of the following:

- All hazardous waste facilities subject to corrective action pursuant to Section 25187.5 of the Health and Safety Code.
- All land designated as hazardous waste property or border zone property pursuant to Article 11 (commencing with Section 25220) of Chapter 6.5 of Division 20 of the Health and Safety Code.
- All information received by the DTSC pursuant to Section 25242 of the Health and Safety Code on hazardous waste disposals on public land.
- All sites listed pursuant to Section 25356 of the Health and Safety Code.
- All sites included in the Abandoned Site Assessment Program.

Santa Clara County

In Santa Clara County, remediation of contaminated sites is generally performed with the oversight of the Santa Clara County Hazardous Materials Compliance Division (a division of the Santa Clara County Department of Environmental Health), or in some instances, the SFBRWQCB and/or the DTSC. At sites where contamination is suspected or known to have occurred, the site owner is required to perform a site investigation and perform site remediation, if necessary. Site remediation or development may also be subject to regulation by other agencies. If the proposed project discharges wastewater to the sanitary sewer a permit for temporary discharge to the San Jose/Santa Clara Water Pollution Control Plant would be required.

3.9.3.2. *Worker Safety Requirements*

Fed-OSHA and Cal-OSHA are the agencies responsible for assuring worker safety in the handling and use of chemicals in the workplace. The Federal regulations pertaining to worker safety are contained in Title 29 of the Code of Federal Regulations (CFR), as authorized in the Occupational Safety and Health Act of 1970. They provide standards for safe workplaces and work practices, including standards relating to hazardous materials handling. In California, Cal-OSHA assumes primary responsibility for developing and enforcing workplace safety regulations.

At sites known or suspected to have soil or groundwater contamination, construction workers must receive training in hazardous materials operations and a site health and safety plan must be prepared. The health and safety plan establishes policies and procedures to protect workers and the public from exposure to potential hazards at the contaminated site. Additional safety and health regulations for construction are set forth in 29 CFR Subpart D, §1926. These regulations cover worker exposures to gases, vapors, fumes, and dust from construction operations.

3.9.3.3. *Wildland Fire*

The California PRC includes fire safety regulations that restrict the use of equipment that may produce a spark, flame, or fire; require the use of spark arrestors on construction equipment that use an internal combustion engine; specify requirements for the safe use of gasoline-powered tools in fire hazard areas; and specify fire suppression equipment that must be provided on-site for various types of work in fire-prone areas. In the City of Milpitas, fire response is under the jurisdiction of the Milpitas Fire Department. The southern portion of Reach 4 is under the jurisdiction of the San Jose Fire Department.

3.9.3.4. *Emergency Response*

California has developed an emergency response plan to coordinate emergency services provided by Federal, State, and local government and private agencies. Responding to hazardous materials incidents is one part of this plan. The plan is administered by the State Office of Emergency Services, which coordinates the responses of other agencies. The Milpitas Fire Department Office of Emergency Services coordinates response to fire, hazardous materials, and other emergencies within most of the project area, and the San Jose Fire Department Office of Emergency Services coordinates such response in the south end of Reach 4. The Fire Department members respond and work with the respective police departments, other local fire and police agencies, emergency medical providers, the California Highway Patrol (CHP), the CDFW, and Caltrans.

3.9.3.5. *Hazardous Materials Transportation*

The U.S. Department of Transportation (USDOT) regulates hazardous materials transportation on all interstate roads. Within California, the State agencies with primary responsibility for enforcing Federal and State regulations and for responding to transportation emergencies are the CHP and Caltrans. Together, Federal and State agencies determine driver-training requirements, load-labeling procedures, and container specifications. Although special requirements apply to transporting hazardous materials, requirements for transporting hazardous waste are more stringent, and hazardous waste haulers must be licensed to transport hazardous waste on public roads.

3.9.3.6. *U.S. Army Corps of Engineers Hazardous, Toxic, and Radioactive Waste (HTRW) Policy*

The policy of the USACE regarding HTRW sites is presented in Engineering Regulation 1165-2-132, developed in response to the Federal Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended. This policy stipulates that each civil works project must include a phased and documented review to provide early identification of known and potential HTRW sites that may be affected by a proposed Federal project. In addition, the non-Federal sponsor must ensure cleanup of any identified HTRW prior to initiation of a USACE civil works project. When HTRW sites are identified, response actions must be acceptable to the U.S. EPA and applicable State regulatory agencies.

3.9.4. **Significance Criteria**

Implementation of the proposed project would have significant adverse effect regarding hazardous materials if the project would:

HWM-1 Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;

HWM-2 Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment;

HWM-3 Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within a quarter mile of an existing or proposed school;

HWM-4 Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code §65962.5 and, as a result, would create a significant hazard to the public or the environment;

HWM-5 For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, result in a safety hazard for people residing or working in the project area;

HWM-6 For a project within the vicinity of a private airstrip, result in a safety hazard for people residing or working in the project area;

HWM-7 Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; or

HWM-8 Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

3.9.5. **Potential Impacts**

3.9.5.1. *Significance Criteria with No Impacts*

The following significance criteria are not discussed further in the EIR because the proposed project would not result in impacts related to these criteria:

HWM-3 Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within a quarter mile of an existing or proposed school. There are no schools located within a quarter mile of the contaminated sites that occur within the proposed construction area. Northwoods Elementary School is located approximately 700 feet south of the creek in San Jose, but this is well over 0.5 mile from the nearest contaminated site.

HWM-4 Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code §65962.5 and, as a result, would create a significant hazard to the public or the environment. There are no hazardous waste sites listed pursuant to California Government Code Section 65962.5 identified during searches of the EnviroStor database or other databases within the project area. The JCI Site may be listed under this code, but is located outside of the footprint of project construction, staging, and operations.

HWM-5 Be located within an area covered by an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, and would result in a safety hazard for people residing or working in the project area. The proposed construction area is not located in an area covered by an airport land use plan or within 2 miles of a public airport.

HWM-6 For a project within the vicinity of a private airstrip, would result in a safety hazard for people residing or working in the project area. There are no private airstrips in the vicinity of the proposed construction area.

HWM-8 Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands*.* There are no wildlands or wildland/urban interfaces in the vicinity of the proposed construction area.

3.9.5.2. *Significance Criteria with Potential Impacts*

HWM-1 CREATE A SIGNIFICANT HAZARD TO THE PUBLIC OR THE ENVIRONMENT THROUGH THE ROUTINE TRANSPORT, USE, OR DISPOSAL OF HAZARDOUS MATERIALS

Less than significant with mitigation for construction; less than significant for operations

HWM-2 CREATE A SIGNIFICANT HAZARD TO THE PUBLIC OR THE ENVIRONMENT THROUGH REASONABLY FORESEEABLE UPSET AND ACCIDENT CONDITIONS INVOLVING THE RELEASE OF HAZARDOUS MATERIALS INTO THE ENVIRONMENT

Less than significant with mitigation for construction; less than significant for operations

Generally, careless industrial or commercial activities and practices can result in spills or leaks of hazardous materials to the ground, resulting in soil, air, or groundwater contamination, which may create public health hazards. The four basic exposure pathways through which persons can be exposed to a chemical agent include: inhalation, ingestion, contact, and injection. Human exposure can come as a result of an accidental release during transportation, storage, or handling of hazardous materials. Also, the disturbance of subsurface soil during construction activities can lead to exposure of workers or the public to hazardous materials from excavation, stockpiling, handling, or transportation of soils and groundwater contaminated by hazardous materials from previous spills or leaks.

Potential adverse effects regarding hazardous materials and hazardous wastes associated with implementing the proposed project include: (1) accidental release to the environment of hazardous materials by construction and maintenance equipment and management practices, and (2) incidental exposure of project workers and the public to existing hazardous materials in the soil and groundwater inadvertently encountered during construction and operation of the proposed improvements. The potential for and levels of these two types of HTRW impacts anticipated for the alternatives are presented below.

CONSTRUCTION (ALL REACHES). Project-related construction and maintenance activities would involve the transport and use of potentially hazardous materials, such as fuels (gasoline and diesel), oils and lubricants, and cleaners (e.g., solvents, corrosives, soaps, detergents), which are commonly used in construction projects. The current regulatory environment provides a high level of protection from hazards and hazardous materials transported to and used in construction projects. Transportation of hazardous materials on area roadways is regulated by CHP and Caltrans, and use of these materials is regulated by the DTSC, as outlined in Title 22 of the California Code of Regulations. USDOT (through the Hazardous Materials Transportation Act), and other regulatory agencies provide standards designed to avoid releases including provisions regarding securing materials and container design. The construction contractor would comply with all applicable laws and regulations related to storage and transportation of hazardous materials. In addition, the construction contractor would comply with disclosure laws that

require users, producers, and transporters of hazardous materials and wastes to clearly identify the materials that they use or transport, and to notify the appropriate City, County, State, and Federal agencies in the event of noncompliance.

Despite adherence to regulations, accidental spills of hazardous or regulated materials could occur during construction, which would create a significant hazard to the public or environment. This hazard would be increased during periods of substantial rainfall which could result in increased flow of water within the creek channels. Hazardous materials being used or stockpiled during construction could be washed away by creek waters, resulting in downstream transport~~s~~ of those materials. This would be a significant impact.

As discussed in Section 3.9.1, seven properties in the vicinity of the proposed project were documented to have had releases of hazardous materials to soil and/or groundwater. These properties are all located within Reaches 1–3 (see Figure 3.13). Of these seven sites, only the Great Western Site and the JCI Site are considered to be potential HTRW concerns for the proposed project. The NAT, Lite-On, and Linear Technology sites are all located hydraulically down-gradient from Upper Berryessa Creek; therefore, any contamination originating at these properties would migrate away from the proposed project area. DISC Stampers and Penske Leasing – although located upgradient from Upper Berryessa Creek – are not considered to be HTRW concerns for the proposed project because: (1) their expected constituents pose a lower risk, and (2) any potential contamination from these sites would be adequately addressed by mitigation measures proposed for the JCI Site, which is in proximity to and down-gradient of these sites.

TCE and PCE groundwater plumes are known to exist at the Great Western Site and the JCI Site within Reaches 1–3. The Great Western location is in the vicinity of Yosemite Drive and originates from the former Great Western Chemical Company site at 945 Ames Avenue (see Figure 3-13). The second location is north of Montague Expressway and originates from the former Jones Chemicals site at 985 Montague Expressway. At both sites VOCs are found in soils and groundwater and vaporize when exposed to air, making them inhalable. While VOC levels in soils vapors and groundwater are potential environmental and health concerns at these two contaminated areas, contamination levels in soil are below ESLs and soil itself does not represent a potential environmental or health risk (see Appendix E).

The project area covers some of the off-site portion of the Great Western contamination site. Contamination levels in groundwater at the Great Western Off-Site Area have been measured and found to be below environmental screening levels (ESLs). Based on that information, the SFBRWQCB in October 2012 approved closure of remediation efforts in the shallow groundwater zone (0-40 feet bgs) of the Off-Site Area of the Great Western site. Because the project would include only excavations that are shallower than 40 bgs, the groundwater that would be encountered during project excavation in this area is not expected to be contaminated. Associated risks to workers and public (i.e., potential adverse impacts) would be less than significant at this location. Because groundwater is the source of any potential VOC contamination present in soils and soil vapor at the Great Western site, it is also likely that such contamination would be below approved ESLs, and the associated risks to workers and public (i.e., level of potential adverse impacts) would be less than significant.

At the JCI hazardous waste site (see Figure 3.13), remedial actions have greatly reduced the levels of VOCs contained in groundwater and as soil vapor. However, groundwater monitoring wells in this area near Upper Berryessa Creek sampled as recently as 2013 indicate that in eight of the 20 monitoring wells near the creek the VOC levels are still above RWQCB ESLs. If groundwater is encountered during project excavation in this area it is likely to be contaminated with VOCs, and at levels that may be above

RWQCB ESLs. Because workers or members of the public could be exposed to groundwater contaminated with VOCs above ESLs, this impact would be significant.

Soil vapor sampling in the JCI Off-Site Area near Upper Berryessa Creek as recently as 2014 reported that all sampling points had VOC levels above RWQCB ESLs (for Commercial-Industrial Land Use: 3,000 ug/m^3 for TCE, 2,100 ug/m^3 for PCE). Cal-OSHA has established Permissible Exposure Limits (PELs) and Short-term Exposure Limits (STELs), intended to protect worker exposures during the work day. These are time-weighted averaged (TWA) concentrations that are not to be exceeded during any 8-hour work-shift during a 40-hour week. The applicable PELs are 135 mg/m3 for TCE and 170 mg/m3 for PCE. The STEL is a 15-minute TWA exposure of 537 mg/m3 for TCE and 685 mg/m3 for PCE that should not be exceeded during a workday. USACE would require the construction contractor to prepare a Health and Safety Plan (HSP) that meets Occupational Health and Safety Administration regulations for work at construction sites. The HSP would include measures to detect hazardous soil vapors, if encountered during project excavation in the JCI off-site area, and to protect construction workers. Concentrations of VOCs in soil vapors would not be a hazard to persons outside the construction zone. Because implementation of the HSP would prevent hazardous exposure of construction workers and hazardous exposure of the public is not expected, impacts associated with exposure to soil vapors would be less than significant.

OPERATIONS (ALL REACHES). The proposed project would increase maintenance and operations activities above the baseline by adding inspections and maintenance of floodwalls and the UPRR and Los Coches Creek culverts. The expected increase in vehicle trips would be less than one per month, which would result in negligible and less than significant impacts with regards to hazardous materials.

MITIGATION. The District will work with USACE to implement Mitigation Measures HWM-A, HWM-B, and WAQ-C to reduce the risk and severity of accidental releases of hazardous materials during construction and operations. If ~~substantial amounts of~~ contaminated groundwater ~~were~~ is encountered at the JCI groundwater plume area during project construction, Mitigation Measure HWM-C would be implemented. This mitigation measure ~~would ensure~~ requires that potentially contaminated groundwater encountered during project excavation in the JCI ~~off–site~~groundwater plume area ~~would~~ be collected and treated to reduce levels of VOCs to levels complying with regulatory standards before discharge to the environment. WAQ-C would ensure that during construction hazardous materials and wastes are removed from the creek channel prior to substantial rain so that water flowing in the creek does not to entrain hazardous substances which would adversely affect water quality. These mitigation measures would reduce the level of impact to less than significant by ensuring that contaminated groundwater or surface water would not cause a significant hazard to the public or the environment.

SIGNIFICANCE AFTER MITIGATION. The mitigation measures specified above would reduce the impacts to a less than significant level.

HWM-7 IMPAIR IMPLEMENTATION OF OR PHYSICALLY INTERFERE WITH AN ADOPTED EMERGENCY RESPONSE PLAN OR EMERGENCY EVACUATION PLAN

Less than significant for construction; less than significant for operations.

CONSTRUCTION (ALL REACHES). In the event of large-scale emergencies such as floods or wildfires, the City of Milpitas' Emergency Operation Plan would be implemented by the Milpitas Fire Department Office of Emergency Services (Simonson 2015) and the City of San Jose's Emergency Operation Plan would be implemented by the San Jose Fire Department Office of Emergency Services, in coordination with local police, hospitals, and transportation departments. Traffic delays may occur when trucks

importing or removing materials are entering or leaving the roadways, and temporary lane closures would likely occur on Ames Avenue, Los Coches Street, and Yosemite Drive. However, the duration of lane closures at each location would be short and the roads would continue to remain open with reduced numbers of traffic lanes at all times. Emergency response vehicles would be given priority passage, reducing this impact to less than significant.

Due to the use of fuels, solvents, and other potentially hazardous materials during construction, the proposed project would slightly increase the possibility of a release of hazardous materials. The Emergency Operation Plans of both Milpitas and San Jose have contingencies to respond effectively to such releases, therefore this impact would be less than significant.

OPERATION (ALL REACHES). Operations would include inspections and maintenance of the floodwalls and the new UPRR and Los Coches Creek culverts. These activities would involve a negligible increase in vehicle or truck trips on existing roadways, and would not cause increased congestion or blockages of area roadways. Project operations would not affect emergency services and would not impair or interfere with implementation of an emergency response plan or evacuation plan. By reducing the potential for flooding that could necessitate an emergency response and hinder access by responders, impacts from operations would be beneficial.

MITIGATION (NOT REQUIRED). Although not required to mitigate less than significant impacts, the Mitigation Measures TRA-A (defined in Section 3.15.6) and HWM-B would be implemented. Under these mitigation measures, a traffic management plan as well as an emergency evacuation plan would be developed for the project which would ensure that emergency vehicles have priority access during construction, and would specify evacuation routes and the locations of the nearest emergency service providers.

3.9.6. Mitigation Measures

HWM-A. PREPARE AND IMPLEMENT A SPILL PREVENTION AND RESPONSE PLAN. To avoid and minimize potential accidental spills during construction, the District will work with the USACE to prepare a project-specific Spill Prevention and Response Plan (SPRP) that conforms to applicable local, State, and Federal requirements. The SPRP will be kept on-site during construction and distributed to all workers and managers prior to construction. The SPRP will include measures that ensure the safe handling, use, storage, transport, and disposal of hazardous materials used or encountered during construction. The construction contractors will be required to comply with the SPRP and applicable Federal, State, and local laws. The plan will outline measures for specific handling and reporting procedures for hazardous materials and disposal of hazardous materials removed from the site at an appropriate off-site disposal facility.

HWM-B. PREPARE AND IMPLEMENT EMERGENCY EVACUATION PLAN. Prior to construction, the District will work with the USACE to develop an emergency response plan in consultation with the Milpitas and San Jose emergency response agencies, including Fire and Police Departments. The emergency response plan will identify locations where traffic may be restricted due to project activities, and will include but not be limited to the following: mapping of emergency exits, evacuation routes for vehicles and pedestrians, location of nearest hospitals, and fire departments. The plan will also include provisions for expediting emergency vehicles through construction zones, particularly during periods when partial lane closures are scheduled.

HWM-C. TREAT VOC-CONTAMINATED GROUNDWATER ENCOUNTERED AT JCI OFF-SITE AREA. USACE will implement the project Groundwater Management Plan during project construction. If groundwater ~~containing VOCs above ESLs are~~is encountered at the JCI groundwater plume area during project construction, USACE will collect and containerize groundwater encountered in the JCI VOC plume area. USACE will treat that groundwater to remove contamination before discharge to the creek channel. The treated groundwater will meet discharge standards specified in SFBRWQCB Order No. R2-2012-0012 National Pollutant Discharge Elimination System No. CAG912002. The treatment method will consist of pre-filtration to remove solids from the extracted groundwater, followed by sand and carbon adsorption. Sand and carbon adsorption can be implemented by use of mobile equipment, and has been approved for use by the SFBRWQCB (Tetra Tech, 2015h).

3.9.7. Statement of Impact

As shown in Table 3.24, significant impacts associated with hazardous materials may occur under the proposed project, but would be reduced to less than significant by applying the mitigation measures recommended in Section 3.9.6.

Table 3.24 Statement of Impacts, Hazardous Materials

Impact	Before Mitigation	Mitigation Measures	After Mitigation
HWM-1. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials or hazardous wastes.	S	HWM-A HWM-B ~~HWM-C~~ WAQ-C	LM
HWM-2. Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.	S	HWM-A HWM-B HWM-C WAQ-C	LM
HWM-3. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school.	NI	None	NI
HWM-4. Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code §65962.5 and, as a result, would create a significant hazard to the public or the environment.	NI	None	NI
HWM-5. For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, result in a safety hazard for people residing or working in the project area.	NI	None	NI
HWM-6: For a project within the vicinity of a private airstrip, result in a safety hazard for people residing or working in the project area.	NI	None	NI
HWM-7. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.	LS	HWM-B TRA-A	LS
HWM-8. Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.	NI	None	NI
NI–No Impact, LS–Less than Significant, LM–Less than Significant With Mitigation, S–Significant, SU–Significant and Unavoidable			

3.10. LAND USE AND PLANNING

This section describes current land uses and land use characteristics of the project vicinity, outlines policies and regulations guiding development in the project area, and evaluates the proposed project for consistency with land use regulations.

3.10.1. Environmental Setting

The project area falls within the planning areas of Milpitas and San Jose. The majority of the project area is within Milpitas City limits, and falls within its "Valley Floor Area" for planning purposes. The areas of both cities adjacent to and surrounding the project area are extremely urbanized. A variety of land uses comprise the area along Upper Berryessa Creek as it passes through urbanized Milpitas and San Jose. Figure 3.14 shows that the project area includes or borders six zoning classifications, including single family residential, multi-family residential, industrial, mixed-use, open space, and town center. Table 3.25 shows the land use types by reach.

Table 3.25 Land Use Categories by Reach

Land Use Types	Reach 1	Reach 2	Reach 3	Reach 4
Single Family Residential		X		X
Multi-Family Residential			X	X
Industrial		X	X	X
Mixed Use			X	
Open Space	X	X	X	
Town Center	X			

3.10.2. Existing Conditions

Starting on the upstream (southern) end, the creek within the project boundaries begins at I-680, and runs to Montague Expressway in Reach 4. The south side of this section is within the City limits of San Jose, and is zoned as a single family residential area. The north and east sides of Reach 4 are within the City limits of Milpitas, and are zoned for industrial uses. The west side of Reach 4 is also within Milpitas, and is zoned for multi-family residences. North of Montague Expressway, in Reaches 1–3 and totally within the limits of the City of Milpitas, the creek passes through an industrial area and multi-family residential area, with relatively small amounts of single family residential and parks/open space in the vicinity of Los Coches Street. An area zoned as "Town Center" is found between Los Coches Street and Calaveras Boulevard. Additionally, all channel areas within the City limits of Milpitas are zoned as Park/Open Space. The Union Pacific Railroad tracks run parallel and adjacent to the stream on the east bank, from just downstream of Ames Avenue to just downstream of Montague Expressway (Figure 3.14).

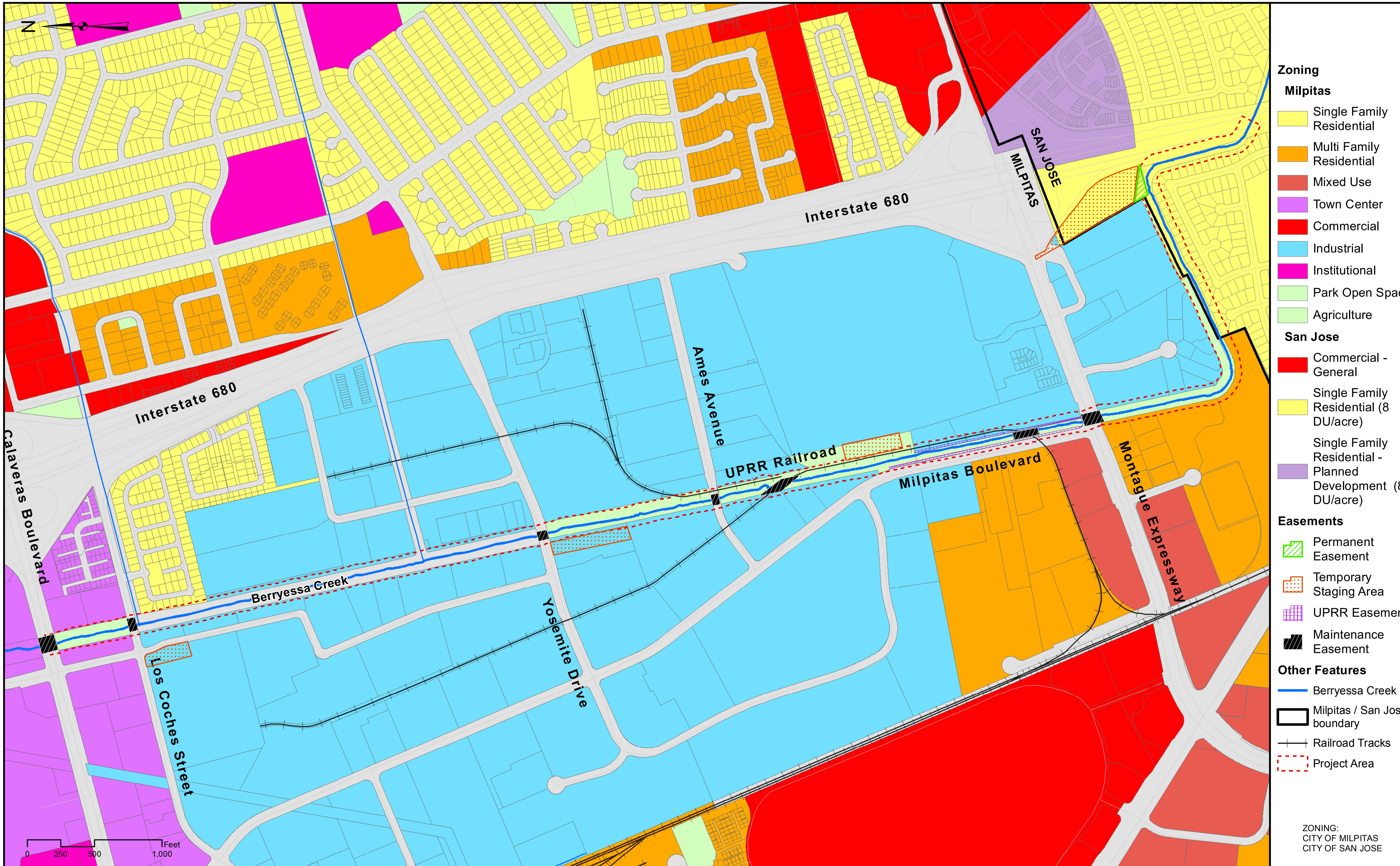

Figure 3.14 Zoning in Project Area

Tetra Tech
17885 Von Karman Avenue, Suite 500
Irvine, CA 92614
Tel. (949) 809-5000 Fax. (949) 809-5003

Santa Clara Valley Water District

UPPER BERRYESSA CREEK
FLOOD RISK MANAGEMENT PROJECT

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3.10.3. **Regulatory Setting**

3.10.3.1. *State Regulations*

CALTRANS ENCROACHMENT PERMIT. Under Section 660 of the California Streets and Highways Code, an encroachment permit must be obtained for all proposed activities for placement of encroachments within, under, or over the State highway right-of-way. Encroachments include utilities, excavations, and vegetation planting or trimming, among others. Permits are issued by Caltrans or specifically authorized local jurisdictions.

3.10.3.2. *Local Plans and Policies*

CITY OF MILPITAS GENERAL PLAN. The vast majority of the project area lies within the City of Milpitas and is governed by the City of Milpitas Master Plan. Adopted in 1994, the plan has been subsequently amended through the 2002, 2008, and 2010 Plan Updates. The plan establishes land use policies for the City in such areas as land use, circulation, open space, and environmental conservation. Policies include the importance of recreational and aesthetic values along the creek. Projections for future development in the Upper Berryessa Creek study area include light manufacturing/industrial park and retail development. In particular, the General Plan's Land Use Element provides the framework for development within the City. This framework is reflected in the zoning classifications shown in Figure 3.14. Two policies and actions within the Master Plan address Berryessa Creek in particular:

> 4.d-A-8 - Coordinate with the Santa Clara Valley Water District to plan and implement multi-objective projects to reduce flood hazards, restore stream functions, and provide recreational resources along Berryessa Creek and other Milpitas creeks.
>
> 4.g-I-13 - Develop the section of Berryessa Creek which runs through the Town Center into a scenic as well as a recreational resource for the Town Center. Town Center is found on both sides of the creek along the Calaveras Boulevard corridor, and includes approximately 800 feet of the channel area in Reach 1.

ENVISION SAN JOSE 2040 MASTER PLAN. A small portion of the project at the southern end of Reach 4 is within the City of San Jose. The Envision San Jose 2040 General Plan was adopted in 2011 in compliance with the State law requiring each City and County prepare and adopt a comprehensive and long-range general plan for its physical development. It encourages the use of flood protection guidelines in development, such as those recommended by the District, FEMA, and Department of Water Resources (DWR). This plan provides the policy framework for the development of San Jose, including the character and quality of future development. The General Plan, developed with community participation, lays out the amount, type, and phasing of development needed to achieve the City's social, economic, and environmental goals. One element of the plan addresses flood hazards, a perennial problem in San Jose. Information on areas that are subject to flood hazards in the City is based on several sources including the Flood Insurance Rate Maps, the Federal Flood Insurance Program, the Federal Emergency Management Agency, the California Department of Water Resources, and the California Emergency Management Agency (the latter related to potential dam failures). The plan calls upon the City of San Jose to cooperate with the District to develop and maintain additional flood protection and retention facilities in areas where they are needed or where the design capacity of existing retention facilities cannot be restored (Goal EC5.8). In addition, the plan calls for developing flood control facilities in cooperation with the District to protect areas from the occurrence of the "1 percent" or "100-year" flood or less frequent flood events when required by the State (Goal EC5.4).

MILPITAS TRAILS MASTER PLAN. The City of Milpitas Trails Master Plan includes the development of 37 acres of trails and plans to interconnect trails with on-street connectors (City of Milpitas, 1997). The Trails Master Plan envisions an off-street trail following Berryessa Creek for the length of the proposed project. The trail would be both a transportation and recreational amenity constructed and maintained by the City. The Plan does not provide a detailed alignment for the planned trail. The majority of the trails identified in the plan follow creeks, rail corridors, and utility ROWs that traverse the City. The plan identifies goals and objectives and priorities for trail development. The Trails Master Plan fulfills the City Council's direction to develop a comprehensive plan for city-wide bicycle trails (City of Milpitas, 1997).

3.10.4. Significance Criteria

The proposed project would have a significant effect on land use if the project would:

- **LND-1** Physically divide an established community;
- **LND-2** Conflict with any applicable land use plan, policy, or regulations of an agency with jurisdiction over the project (including but not limited to the general plan, specific plan, local coastal program or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect; or
- **LND-3** Conflict with any applicable habitat conservation plan or natural community conservation plan.

3.10.5. Potential Impacts

3.10.5.1. *Significance Criteria with No Impacts*

LND-1 PHYSICALLY DIVIDE AN ESTABLISHED COMMUNITY

No impact for construction; no impact for operations

CONSTRUCTION (ALL REACHES). The proposed project would not introduce new land uses or result in any permanent land use changes. Because the proposed project would continue to occupy the same area as under existing conditions and all existing road and railroad crossings of the creek would remain, the proposed project would not physically divide any established communities and no impact would result.

OPERATIONS (ALL REACHES). Operations and maintenance would not introduce any measures that would physically divide the established community; therefore, there would be no impact.

3.10.5.2. *Significance Criteria with Potential Impacts*

LND-2 CONFLICT WITH ANY APPLICABLE LAND USE PLAN, POLICY, OR REGULATIONS OF AN AGENCY WITH JURISDICTION OVER THE PROJECT

Less than significant for construction; Less than significant with mitigation for operations

CONSTRUCTION (REACHES 1–3). The proposed project would not require zoning changes or result in any permanent changes to land uses. The proposed project would be consistent with current land use elements in the Milpitas General Plan and would reduce flood damages to existing residences, businesses, and other land uses. There would be temporary changes in land use due to the use of several parcels as construction staging areas (Figure 3.14). The southernmost staging site in Reaches 1–3 is located on the east side of the creek between Ames Avenue and Montague Expressway. The site is

undeveloped and located between a warehouse structure and a railroad track. The second staging area is west of the creek and just south of Yosemite Drive. The northern portion of the site has been cleared and graded and used as overflow parking for an adjacent manufacturing and distribution business. The remainder of the site is undeveloped. The third staging area, located at the southwest corner of Los Coches Street and S. Hillview Drive, is undeveloped. The District would attain construction easements with land owners for all proposed construction staging sites. Staging areas would be restored to pre-existing conditions as construction is completed. Land use impacts from construction in Reaches 1-3, including construction staging, would be temporary and would last only for the period of construction. Construction of the he proposed project would not conflict with any applicable land use plan, policy, or regulations of an agency with jurisdiction over the project in Reaches 1–3; therefore, this impact is less than significant.

CONSTRUCTION (REACH 4). The proposed project would not require zoning changes or result in any permanent changes to land uses. The proposed project would be consistent with current land use elements in the Milpitas General Plan (City of Milpitas, 2002) and the San Jose General Plan (Envision San Jose 2040) (City of San Jose 2011) and would reduce flood damages to existing residences, businesses and other land uses. There would be temporary changes in land use due to the use of one site as a construction staging area. The staging area in this reach, located at the southwest corner of Montague Expressway and I-680, is undeveloped and portions appear to have served as a storage facility for construction materials in the past. The District would attain a construction easement for access to and use of this staging area and the area would be restored to pre-existing conditions as construction is completed. The District would attain a permanent easement that would allow access to the upper end of Reach 4 at this location (see Figure 3.14), although having this easement in place would not change the use of the lands within the easement area. Land use impacts from construction in Reach 4 would be less than significant.

OPERATIONS (ALL REACHES).

The proposed project design includes a channel access road on the east bank of the channel extending from Calaveras Boulevard to Ames Avenue in Reaches 1 and 2 and a portion of Reach 3. This access road would be continuous from Calaveras Boulevard to Ames Avenue with gates at the entrances to the access road at the paved streets (i.e. Calaveras Boulevard, Los Coches Street, Yosemite Drive, and Ames Avenue). In addition, the project would include an east/north bank channel access road extending from Montague Expressway to I-680 in Reach 4 with a gate at the Montague Expressway entrance. The creek access roads in these reaches would be surfaced with decomposed granite, which could be paved with asphalt to provide an all-weather surface. However, in the portion of Reach 3 between Ames Avenue and Montague Expressway, the creek access road would not be continuous due to the presence of UPRR tracks on either side of the creek channel. The access road would not cross these tracks due to safety concerns, but would consist of discrete segments that would not connect to one another. Thus, if the trail followed the access roads, it would have to divert to Milpitas Boulevard at Ames Avenue and continue along Milpitas Boulevard upstream to Montague Expressway. The proposed access roads in Reaches 1 through 3 could physically accommodate the planned trail for most of the length included in the City of Milpitas' Trails Master Plan. However, the proposed project would include fencing and locked gates at the entrances to the creek access road from the paved streets (i.e. Calaveras Boulevard, Los Coches Street, Yosemite Drive, and Ames Avenue) which would prevent public access to the creek right of way in the event that a trail is built in the future. The proposed project would conflict with the Milpitas Trails Master plan, which would be a significant impact.

MITIGATION. (REACHES 1-3). If the City of Milpitas proceeds with planning and construction of the Berryessa Creek recreational and transportation trail, the District will implement Mitigation Measure LND-A (Allow public access to creek right of way) to address the conflict with the Milpitas Trails Master Plan. Mitigation Measure LND-A requires that the District work with the City of Milpitas to execute a joint use agreement (JUA) which would allow public access to a trail on the creek right of way.

SIGNIFICANCE AFTER MITIGATION. Implementation of Mitigation Measure LND-A (Allow public access to creek right of way) would provide the City of Milpitas with access to the creek ROW to develop a recreational and transportation trail consistent with the City of Milpitas Master Plan, removing the conflict with the plan and reducing this impact to less than significant with mitigation.

LND-3 CONFLICT WITH ANY APPLICABLE HABITAT CONSERVATION PLAN OR NATURAL COMMUNITY CONSERVATION PLAN

Less than significant for construction; less than significant for operations

CONSTRUCTION (REACHES 1–3). Reaches 1–3 are not located within an area covered by an HCP or NCCP so there would be no conflict with any applicable plans in these reaches during construction or operations; therefore, there would be no impacts.

CONSTRUCTION (REACH 4). The upstream portion of Reach 4 is within the City of San Jose and is within the plan area of the Santa Clara Valley Habitat Conservation Plan/Natural Community Conservation Plan (Santa Clara Valley Habitat Agency 2012). USACE-led projects are exempt from the plan. Because the proposed project would be led by USACE, the HCP is not applicable to the proposed project and impacts would be less than significant.

OPERATIONS (ALL REACHES). Project operations would continue to occur within the same footprint as they currently do, and would be similar to those occurring under current conditions. There would be no impacts associated with HCPs or NCCPs from operations.

3.10.6. Mitigation Measures

LND-A ALLOW PUBLIC ACCESS TO CREEK RIGHT OF WAY. The District will work with the City of Milpitas to execute a JUA to allow public access to a trail on the creek right of way.

3.10.7. Statement of Impact

Table 3.26 summarizes the significance of effects on land use from implementing the proposed project. The proposed project would result in a significant impact due to a conflict with the Milpitas Trails Master Plan, but this impact would be reduced to less than significant by implementing Mitigation Measure LND-A.

Table 3.26 Statement of Impacts, Land Use and Planning			
Impact	**Prior to Mitigation**	**Mitigation Measures**	**After Mitigation**
LND-1. Physically divide an established community.	NI	None	NI
LND-2. Conflict with any applicable land use plan, policy, or regulations of an agency with jurisdiction over the project (including but not limited to the General Plan, Specific Plan, local coastal plan, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect.	S	LND-A	LM
LND-3. Conflict with any applicable habitat conservation plan or natural community conservation plan.	LS	None	LS
NI–No Impact, LS–Less than Significant, LM–Less than Significant with Mitigation, S–Significant, SU–Significant and Unavoidable			

3.11. NOISE

This section presents information on existing noise conditions in the study area, identifies the noise sensitive receptors that are present, and evaluates the potential impacts from construction, operations, and maintenance activities on noise levels and sensitive receptors. If project-related impacts are found to exceed thresholds of significance, mitigation measures are identified.

3.11.1. Environmental Setting

Noise is generally defined as sound that is loud, disagreeable, or unexpected. Sound is mechanical energy transmitted in the form of a wave caused by a disturbance or vibration. The human ear has the ability to detect a wide range of sound pressure fluctuations. Sound pressure levels are expressed in logarithmic units called decibels (dB).

Noise levels in the project area are typical of urban residential and industrial areas. Five roadways, two railways, and one pedestrian bridge cross the creek within the project area. Vehicular traffic along the major arterials (especially the Montague Expressway and E. Calaveras Boulevard) and the I-680 freeway are the primary noise sources in the study area. Noise and vibration also occur as a result of train activity on the UPRR lines, which run along the east side of the project area and cross the stream at two locations between Ames Avenue and Montague Expressway.

3.11.2. Existing Conditions

Noise is measured in decibels (dB) and then frequencies are weighted based on the human response to sound, denoted as A-weighted decibels (dBA). In general, a difference of more than 3 dBA is a perceptible change in environmental noise, while a 5 dBA difference typically causes a change in community reaction. An increase of 10 dBA is perceived by people as a doubling of loudness (EPA 1974).

The ambient acoustic environment within 500 feet of the study area represents the limits of this noise analysis and encompasses a variety of noise sources. The assumed existing primary source of noise is from high traffic arterials, which generate consistent noise patterns in the study area. Other major noise sources include railways, industrial yards, and surface street use.

Noise sensitive receptors within 1,000 feet of the study area have been identified and are shown in Figure 3.8. Generally, noise sensitive receptors are locations where people sleep or where noise can affect the function of the receptor. Examples of noise sensitive receptors include, but are not limited to, residential areas, schools, parks, community centers, public facilities, hotels, hospitals, and places of worship. Noise sensitive receptors within the vicinity of the project area are identified below.

Ambient noise conditions are documented in this report primarily through qualitative assessment of potential noise sources in the study area. Noise monitoring was not conducted as a part of this EIR.

Noise levels from vehicular traffic in the study area range from 60 to 80 Ldn (day-night average sound level expressed in decibels), based on information contained in the Midtown Milpitas Specific Plan and the Capital Corridor Light Rail Project EIR, according to the USACE GRR-EIS (USACE 2014). The upper end of this range may be expected during peak hours adjacent to I-680, while the lower values would be expected near arterials. The rail line within the project area does not pass sensitive receptors; a spur track terminates south of a housing subdivision between Yosemite Drive and Los Coches Street. While noise levels due to freight operation adjacent to the track can be in excess of 70 Ldn, they decrease to 60 Ldn approximately 300 feet from the track.

The noise-sensitive land uses identified through land use maps, aerial photographs, and search of online directories in or near the study area within Reaches 1–3 include a residential subdivision just south of Los Coches Street in Milpitas, and the Western Learning Center, a child care facility, over 500 feet northeast of the project terminus in Milpitas. A single family residential area lies more than 500 feet northwest of the project terminus in Milpitas.

Noise-sensitive land uses in or near the project area in Reach 4 include residential areas within 50 feet of the creek at the southern end of the project area (eastern edge of The Crossing at Montague Expressway in Milpitas; Lakewood Drive and Muirwood Court in San Jose) and the Northwoods Elementary School 700 feet west of the creek in San Jose.

3.11.3. **Regulatory Setting**

3.11.3.1. *Local Plans and Policies*

Federal and State governments provide guidelines for construction noise in regard to worker protection and, for this project, traffic noise. California cities are required to have noise elements in their general plans; the noise elements are planning guides to ensure that noise levels are compatible with adjacent land uses. Most jurisdictions also have noise ordinances, which serve as enforcement mechanisms for controlling noise. Noise elements from the general plans of Milpitas and San Jose are described below.

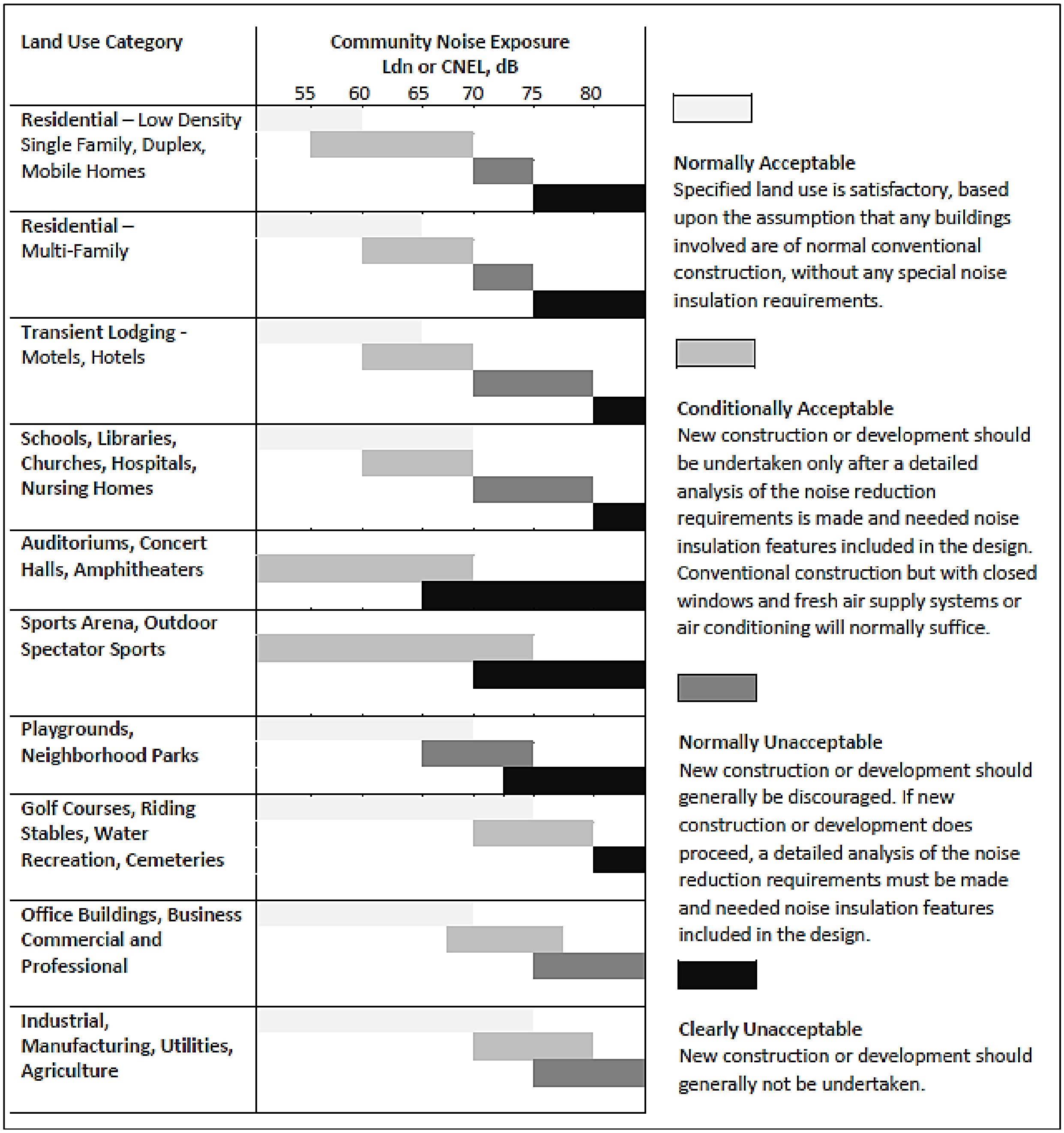


Figure 3.15 Community Noise Exposure Thresholds, City of Milpitas

CITY OF MILPITAS GENERAL PLAN. The City of Milpitas General Plan Noise Element establishes standards to "avoid residential...exposure increases of more than 3 dB or more than 65 dB at the property line, whichever is more restrictive" (City of Milpitas 1994). The noise exposure levels are determined using Day-Night Noise Levels (Ldn) or Community Noise Exposure Levels (CNEL) which are based on 24-hr average noise exposure. The Ldn measure adds a 10 dB (decibel) penalty to noise events occurring between 10:00 PM and 7:00 AM to reflect the increased sensitivity of receptors to nighttime noise. The CNEL noise exposure measure is a similar 24-hour noise measure, but adds an additional 5 dB

penalty for noise events occurring between 7:00 PM and 10:00 pm to reflect sensitivity to evening noise (Noisemeters, Inc. 2015).

The Noise Element of the Milpitas General Plan includes principles and policies designed to reduce or eliminate the effects of excessive noise in the neighborhoods. Specific applicable principles and policies include:

- 6-G-1: Maintain land use compatibility with noise levels similar to those set by State guidelines.
- 6-G-2: Minimize unnecessary, annoying, or injurious noise.
- 6-I-1: Use guidelines in the Noise and Land Use Compatibility Table (shown in Figure 3.15) as review criteria for development projects.
- 6-I-6: Assist in enforcing compliance with noise emissions standards for all types of vehicles.
- 6-I-7: Avoid residential DNL exposure increases of more than 3 dB or more than 65 dB at property line, whichever is more restrictive.
- 6-I-9: Enforce the provisions of the City of Milpitas Noise Ordinance and the use of established truck routes.
- 6-I-10: Reduce the noise impact in existing residential areas where feasible. Noise mitigation measures should be implemented with the cost shared by public and private agencies and individuals.
- 6-I-13: Restrict the hours of operation, technique, and equipment used in all public and private construction activities to minimize noise impact. Include noise specifications in requests for bids and equipment information.

CITY OF MILPITAS NOISE ABATEMENT ORDINANCE. Chapter 213 of the Milpitas Municipal Code contains regulations that apply to noise abatement. Section V-213-3 of the Code states that “it shall be unlawful for any person in any district zoned for residential use (under the provisions of Chapter 10, Title XI of the Milpitas Municipal Code) to make, continue or cause to be made or continued, any disturbing noise between the hours of 10 p.m. in the evening to 7 a.m. in the morning.” Disturbing noise is defined as any sound or vibration caused by sound which occurs with such intensity, frequency or in such a manner as to disturb the peace and quiet of any person.

The section also includes specific regulations that apply to construction activities. It requires that all construction activities and construction-related operations, including delivery of construction materials, supplies, or improvements on or to a construction site, shall be restricted to the hours between 7:00 a.m. and 7 p.m. on weekdays and weekends. No construction work shall be conducted or performed on holidays (City of Milpitas 2008).

SAN JOSE ENVISION 2040 GENERAL PLAN. The City of San Jose’s General Plan has established the objectives of 55 decibels Ldn (average day/night noise level) as the long-term exterior noise level and 60 dB as the short-term exterior noise level (City of San Jose 2011). These standards are applicable to stationary noise sources such as factories, and to construction projects lasting longer than 12 months.

San Jose’s Municipal Code (20.100.450) does not allow any construction activity within 500 feet of a residential area before 7 a.m. or after 7 p.m. Monday through Friday, or anytime on weekends.

Goal EC-1.7 of San Jose’s General Plan requires construction operations within San Jose to use best available noise suppression devices and techniques and limit construction hours near residential uses per the City’s Municipal Code. The City considers significant construction noise impacts to occur if a

project located within 500 feet of residential uses or 200 feet of commercial or office uses would involve substantial noise generating activities (such as building demolition, grading, excavation, pile-driving, use of impact equipment, or building framing) continuously for more than 12 months.

3.11.4. Significance Criteria

The proposed project would cause significant noise impacts if it would result in:

NOI-1 Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standard of other agencies;

NOI-2 Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels;

NOI-3 A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;

NOI-4 A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;

NOI-5 For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, exposure of persons residing or working in the project area to excessive noise levels; or

NOI-6 For a project within the vicinity of a private airstrip, exposure of persons residing or working in the project area to excessive noise levels.

3.11.5. Potential Impacts

3.11.5.1. *Significance Criteria with No Impact*

The following significance criteria are not discussed further in the EIR because the proposed project would not result in impacts related to these criteria:

NOI-3 **Substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.** No project features would generate noise after completion of construction other than occasional and temporary maintenance actions.

NOI-5 **For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels.** The nearest public airport is Norman Y. Mineta San Jose International Airport, which is located over 3 miles away from the project area, and there are no private airstrips in the vicinity of the project area.

NOI-6 **For a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels.** There are no private airstrips in the vicinity of the project area.

3.11.5.2. *Significance Criteria with Potential Impacts*

NOI-1 EXPOSURE OF PERSONS TO OR GENERATION OF NOISE LEVELS IN EXCESS OF STANDARDS ESTABLISHED IN THE LOCAL GENERAL PLAN OR NOISE ORDINANCE, OR APPLICABLE STANDARD OF OTHER AGENCIES

Significant and unavoidable for construction; less than significant for operations

CONSTRUCTION (REACHES 1–3). Reaches 1 through 3 are within the City of Milpitas. Sensitive receptors in Reaches 1–3 that could be affected by construction noise include residents within 50 feet of the construction zone south of Los Coches Street, staff and guests at hotels located approximately 700 feet southeast of the southern end of the project area, workers in businesses within 50 feet of the construction zone, workers and residents along haul routes, and wildlife, which may appear anywhere within the channel.

The primary noise-generating activities related to construction of the project would be site preparation and earth-moving activities, hauling construction debris, concrete placement (constructing the floodwall, trapezoidal channel, channel transitions, and miscellaneous concrete improvements), and re-installing rail tracks at the UPRR trestle replacement site. Because this area is within the JCI plume area, groundwater encountered during earthwork would be collected and treated to remove VOCs before discharge to the creek. The groundwater, pumping, collection and treatment system would be powered by one to three diesel generators which would operate up to 24 hours per day for a period estimated at 2 to 3 weeks (Tetra Tech 2015h). The main noise sources associated with site preparation and earthmoving activities would be the operation of bulldozers, loaders, excavators, and backhoes that would remove material, as well as trucks hauling excavated materials from the project area. The main noise sources associated with site improvements would be the operation of trucks, augers, soil stabilizers, and cranes. The primary noise-generating equipment used in concrete removal and placement would be jackhammers, excavators, loaders, compactors, concrete mixers, cranes, and pumps.

Consistency with C~~c~~ity of Milpitas General Plan Noise Element Community Noise Exposure Policies

The Milpitas' General Plan Noise Element limits residential noise exposure to increases of no more than 3 dB or overall community noise exposure to no more than 65 dB Ldn at the property line, whichever is more restrictive (Impact NOI-1). Up to 50 truck trips per day may occur throughout Reaches 1-3. Construction-related material haul trips would raise noise levels along designated truck routes. Most haul trips would occur primarily on either Calaveras Boulevard or Montague Expressway, both of which are designated truck routes with high ambient traffic noise levels. Haul trucks would occasionally use side streets and feeder streets to reach Calaveras Boulevard and Montague Expressway, resulting in temporary increases in noise on these streets. Assuming that trucks pass by residences at an approximate distance of 50 feet, dump trucks may generate temporary noise levels of up to 77 dBA, and haul trucks up to 84 dBA (FTA 2006). Although the ambient noise levels on side streets is not high, each instance of increased noise from truck traffic would be limited to the time it takes for the truck to start out and to pass receptors, which is likely less than 10 seconds per instance. This impact would be temporary and the truck trips on any given day would be spread out on designated truck routes between Calaveras Boulevard and Montague Expressway. The noise generated by construction trucks would only occur for short intervals of time during normal business hours. Even if all 50 truck trips per day were to pass the same residential location, they would affect that residential receptor less than 1% of the 24-hr day, which would not result in an increase of 3 dB or more in Ldn or raise the ambient Ldn to greater than 65dB. Truck traffic would not generate noise exceeding the community noise exposure thresholds contained in the City of Milpitas General Plan.

Construction noise caused by equipment and activities at the construction site would be intermittent. Although short-term noise events could reach up to 90 ~~Db~~ dB at 50 feet (see Table 3.27 below), these levels would be short-lived and noise levels would dissipate quickly with distance from the source.

Because these noise events would occur over only a small portion of the 24-hour day, they would not increase 24-hour Ldn exposure level by more than 3 dB or raise ambient levels above 65 dB. These noise levels would not exceed conditionally acceptable noise levels for residential uses specified in the City of Milpitas General Plan. Thus, the noise levels generated by construction activities and truck traffic are not expected to exceed the acceptable noise levels for residential uses specified in the City of Milpitas General Plan. This impact would be less than significant.

Table 3.27 Construction Equipment Noise Levels

Equipment Type	Typical Noise Level (dB) at 50 Feet	Equipment Type	Typical Noise Level (dB) at 50 Feet
Air compressor	78	Generator	81
Asphalt paver	77	Grader	85
Backhoe/Loader	78	Hoe ram extension	90
Compactor	83	Jack hammer	89
Concrete breaker	82	Pneumatic tools	85
Concrete pump	81	Rock drill	81
Concrete saw	90	Scraper	84
Crane, mobile	81	Trucks	74-81
Dozer	82	Water pump	81

dBA = A-weighted decibels. All equipment fitted with properly maintained and operational noise control device, per manufacturer specifications. Noise levels listed are the actual measured noise levels for each piece of heavy construction equipment.
Sources: Bolt, Beranek, and Newman 1981:8-5; FTA 2006:12-6 to 12-7

Consistency with Milpitas Limitations in Construction Hours

As described in the project description, construction would generally occur during normal business hours. The UPRR trestle would be replaced with a double barrel concrete box culvert. The culvert would be a precast structure, and would be placed over the course of three days, during which time the UPRR rail line would be closed. The timing of the replacement would be coordinated with UPRR and may require continuous work over a 72-hour period to minimize line closure time and disruption of service. Additionally, because this area is within the JCI plume area, groundwater encountered during earthwork would be collected and treated to remove VOCs before discharge to the creek. The groundwater collection and treatment system would be powered by one or more diesel generators which would operate up to 24 hours per day for a period estimated at 2 to 3 weeks (Tetra Tech 2015h). Construction of the UPRR replacement culvert and groundwater collection and treatment (including operation of power generators) would occur outside the 7 AM to 7 PM window allowed by the City of Milpitas Noise Abatement Ordinance. ~~Construction of the UPRR replacement culvert would occur outside the 7 a.m. to 7 p.m. window allowed by the City of Milpitas Noise Abatement Ordinance.~~ The UPRR trestle is not located in an area that contains residences, although a church is located approximately 900 feet east of the construction area. Noise impacts associated with construction at this location would be significant when compared to the NOI-1 significance threshold because construction noise would occur outside of the allowable construction times of 7:00 am to 7:00 pm identified in the City of Milpitas Noise Abatement Ordinance.

CONSTRUCTION (REACH 4). Noise standards established by the cities of Milpitas and San Jose apply to construction in Reach 4 which covers portions of the two cities. These standards are described in Section 3.11.3, and establish allowable noise levels at the locations of sensitive receptors as well as time periods in which construction noise may occur. Sensitive receptors in Reach 4 that could be affected by construction noise include residents along Lakewood Dr., Muirwood Court and apartments at the

eastern edge of The Crossing at Montague Expressway, both within fifty feet of the creek; and Northwoods Elementary School (700 feet from the creek).

Consistency with Milpitas' and San Jose's L~~l~~imitations in C~~c~~onstruction H~~h~~ours~~.~~

All construction work in Reach 4 would occur within the allowable construction windows set by the cities of Milpitas and San Jose.

Consistency with Milpitas' General Plan Noise Element

Up to 50 truck trips per day may occur throughout Reaches 4. Construction-related material haul trips would raise noise levels along designated truck routes. Most haul trips would occur primarily on Montague Expressway, which is a designated truck route with high ambient traffic noise levels. Haul trucks would occasionally use creek access roads adjacent to the Reach 4 channel to travel to and from Montague Expressway. Assuming that trucks pass by residences at an approximate distance of 50 feet, dump trucks may generate temporary noise levels of up to 77 dBA, and haul trucks up to 84 dBA (FTA 2006). Although the ambient noise levels on side streets is not high, each instance of increased noise from truck traffic would be limited to the time it takes for the truck to start out and to pass receptors, which is likely less than 10 seconds per instance. The noise generated by construction trucks would only occur for short intervals of time during normal business hours. Even if all 50 truck trips per day were to pass the same residential location, they would affect that residential receptor less than 1% of the 24-hr day, which would not result in an increase of 3 dB or more in Ldn or raise the ambient Ldn to greater than 65dB. Truck traffic would not generate noise exceeding the community noise exposure thresholds contained in the City of Milpitas General Plan. As is the case for project construction activities in Reaches 1 to 3, construction noise would be sporadic and intermittent, and would not result in a 3 dB increase in the Ldn average noise level experienced by nearby residents or employees or increase ambient noise levels above 65 dB. Construction noise in Reach 4 would be compatible with community noise exposure policies contained in the City of Milpitas General Plan. The impact would be less than significant.

Consistency with City of San Jose Envision 2040 General Plan

San Jose's General Plan Goal EC-1.7 states that the City considers significant construction noise impacts to occur if a project located within 500 feet of residential uses or 200 feet of commercial uses would involve substantial noise generating activities continuously for more than 12 months. As described in the Project Description, construction would occur over 1 to 2 years and primarily during dry season from May to October. Construction noise would not occur continuously for more than 12 months. Thus, construction noise impacts would be consistent with City of San Jose Envision 2040 General Plan Noise Policy EC1.7 and this impact would be less than significant.

OPERATIONS (ALL REACHES). Operations and maintenance would occur only occasionally and would be temporary. Although the presence of floodwalls may necessitate additional maintenance for graffiti removal and inspection, these activities would not generate substantial noise levels. Noise impacts during operations and maintenance would be less than significant.

MITIGATION (ALL REACHES). The project sponsors would implement Mitigation Measures NOI-A and NOI-B, which are designed to reduce construction noise impacts and to comply with local noise standards.

SIGNIFICANCE AFTER MITIGATION.

Implementing Mitigation Measures NOI-A and NOI-B would reduce construction-related noise impacts. However, project construction would still result in a significant and unavoidable impact due to

generation of construction noise outside hours allowed by the City of Milpitas Noise Abatement Ordinance.

NOI-2 EXPOSURE OF PERSONS TO OR GENERATION OF EXCESSIVE GROUND-BORNE VIBRATION OR GROUND-BORNE NOISE LEVELS

Less than significant for construction; no impact for operations

CONSTRUCTION (ALL REACHES). Ground-based vibration levels can cause damage to structures and can be disruptive to sensitive receptors in the immediate area. Vibration levels differ by type of construction activity and type of equipment being used. Drill rigs and large bulldozers would be the typical equipment used on this project that would result in the highest levels of vibration, as shown in Table 3.28.

Table 3.28 Vibration from Drill Rigs and Large Bulldozers

Distance from Source	Peak Particle Velocity (inches per second)
25 feet	0.089
50 feet	0.031
75 feet	0.017
Source: FTA 2006	

Construction vibration would be considered significant if it would exceed the Caltrans standard of 0.2 inch per second for the protection of fragile buildings and interference or annoyance to human sensitive receptors. The nearest sensitive receptors consist of residential uses in Reaches 2 and 4 that would be within 25 feet of construction equipment. At 25 feet, construction equipment vibration levels range up to 0.089 in/sec, which would be less than the 0.20 in/sec standard (Caltrans 2002). Therefore, the impacts would be less than significant.

Noise generated by the type of construction activities that would occur as part of the project is more effectively transmitted through air than through ground. Sensitive noise receptors in the vicinity would not be significantly affected by ground-borne noise. This impact would be less than significant.

OPERATIONS (ALL REACHES). The proposed project would not generate substantial vibration or ground-borne noise during operation. Impacts would be less than significant.

NOI-4 SUBSTANTIAL TEMPORARY INCREASE IN AMBIENT NOISE LEVELS IN THE PROJECT VICINITY ABOVE LEVELS EXISTING WITHOUT THE PROJECT

Less than significant with mitigation for construction; less than significant for operations

CONSTRUCTION (ALL REACHES). While the noise levels generated by construction equipment and truck traffic would not exceed the numeric 24-hour averaged residential noise level threshold established in the Milpitas' General Plan Noise Element as discussed above under the analysis of Impact NOI-1, there would be a temporary increase of ambient noise as a result of the proposed project. As discussed above, the truck traffic may generate up to 77-84 dBA during construction, and construction equipment may generate up to 74-90 dB at 50 feet. Noise from traffic passing would be sporadic and spread out during the normal business hours, and noise from construction at any given location would likely last less than 2 months; however, based on the estimated current ambient noise (between 55 and 65 dBA) and given their distances from the project area, the temporary increase in ambient noise levels

experienced by residents and businesses in the project area could be substantial. This impact would be significant.

OPERATIONS (ALL REACHES). Operations and maintenance would occur only occasionally and would be temporary. Although the presence of floodwalls may necessitate additional maintenance for graffiti removal and inspection, these activities would not generate substantial noise levels. Temporary noise impacts during operations and maintenance would be less than significant.

MITIGATION (ALL REACHES). The project sponsors would implement measures NOI-A, NOI-B, and NOI-C, which are designed to reduce construction noise impacts and to help ensure compliance with local noise standards as specified in Section 3.11.6.

SIGNIFICANCE AFTER MITIGATION. Implementing Mitigation Measures NOI-A, NOI-B, and NOI-C would reduce temporary construction-related noise impacts to a less than significant level because these measures would prevent substantial noise impacts by using the best available noise suppression technology, locating noisy construction equipment as far as possible from sensitive receptors, provide a point of contact to foster resolution of noise complaints, and ensure compliance with local noise standards.

3.11.6. Mitigation Measures

NOI-A. ALERT NEIGHBORS. The District will notify residents in the vicinity of proposed project construction activities about the type and schedule of construction. Prior to construction, USACE will require the contractor to place signs throughout the proposed project area alerting neighbors to pending construction.

NOI-B. USE NOISE SUPPRESSION TECHNIQUES. The District will work with the USACE to assure the following mitigation measure is implemented. The construction contractor will use available noise suppression devices and techniques. Construction equipment noise will be minimized during project construction by muffling and shielding intakes and exhaust on construction equipment (per the manufacturer's specifications) and by shrouding or shielding impact tools. Noise-reduction measures specified in the City of San Jose's Noise Ordinance are described below, and will be implemented.

- Utilize 'quiet' models of air compressors and other stationary noise sources where technology exists;
- Equip all internal combustion engine-driven equipment with mufflers, which are in good condition and appropriate for the equipment;
- Locate all stationary noise-generating equipment, such as air compressors and portable power generators, as far away as possible from adjacent land uses;
- Locate staging areas and construction material areas as far away as possible from adjacent land uses;
- Prohibit all unnecessary idling of internal combustion engines;
- Designate a "disturbance coordinator" who would be responsible for responding to any local complaints about construction noise. The disturbance coordinator will determine the cause of the noise complaint and will require that reasonable measures warranted to correct the problem be implemented. Conspicuously post a telephone number for the disturbance coordinator at the construction site and include it in the notice sent to neighbors regarding the construction schedule.

NOI-C. LIMIT CONSTRUCTION HOURS. The District will work with the USACE to assure the following mitigation measure is implemented whenever possible. Construction hours will be consistent with both the City of Milpitas Municipal Code and the San Jose Municipal Code to the maximum extent possible. Specifically, the Milpitas City Code Municipal Code, Section V-213-3 allows construction in residential areas to 7 a.m. and 7 p.m. on weekdays and weekends (Hom, 2015). Construction in residential areas is not permitted on holidays. The San Jose Municipal Code limits construction to between 7 a.m. and 7 p.m. Monday thru Saturday except within 500 feet of residential units, when construction is limited to Monday through Friday, 7 a.m. to 7 p.m. (Municipal Code 20.100.450).

3.11.7. Statement of Impact

As shown in Table 3.29, work occurring outside of the allowable construction times established by the City of Milpitas and temporary increases in ambient noise levels would constitute significant and unavoidable impacts. All other impacts would be reduced to less than significant with incorporation of mitigation measures.

Table 3.29 Statement of Impacts, Noise

Impact	Prior to Mitigation	Applicable Mitigation	After Mitigation
NOl-1. Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standard of other agencies	S	NOI-A NOI-B	SU
NOl-2. Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels	LS	None	LS
NOl-3. Substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project	NI	None	NI
NOI-4. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project	S	NOI-A NOI-B NOI-C	LM
NOl-5. For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels	NI	None	NI
NOl-6. For a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels	NI	None	NI
NI–No Impact, LS–Less than Significant, LM–Less than Significant with Mitigation, S–Significant, SU–Significant and Unavoidable			

3.12. POPULATION AND HOUSING

This section describes the existing population within the project area both from a regional and local standpoint, provides an assessment of housing availability and occupancy in the area, and surveys the industries that are dominant employers. Potential impacts to population growth and the availability of housing are evaluated in this section based on established significance criteria.

3.12.1. Environmental Setting

The vicinity of the project area is dominated by large streets or freeways, industrial uses, railroad tracks, and commercial areas. Housing developments and apartments border the project area in Reaches 1 and 4, but housing is not a dominant land use in the area. In general, population densities in Milpitas and San Jose are moderate to high relative to other communities in the surrounding area.

3.12.2. Existing Conditions

Population and socioeconomic data for the project area come from the U.S. Census Bureau (2010, 2013) unless otherwise noted. Data for the Cities of Milpitas and San Jose and two census tracts are provided in the tables and descriptions below. The vast majority of the project footprint is covered by Census Tract 5045.04, while Census Tract 5044.14 covers only the 50 feet downstream of Calaveras Boulevard.

There are approximately 1.8 million people living in Santa Clara County, with 945,942 (53 percent) of those residents living in San Jose and 66,790 (4 percent) living in Milpitas (Table 3.30). The population of San Jose is estimated to have increased by 1.7 percent in 2013 to over a million people, and it is the third largest city in California (City of San Jose 2015).

As shown in Table 3.30, population density in San Jose is 5,710 and in Milpitas is 4,914 people per square mile, a much denser population compared to the overall Santa Clara County density of only 1,381 (City Data 2014). The population of the immediate vicinity (Census Tract 5045.04) has around 10,000 people, with the largest number of individuals falling within the ages of 25 and 49.

Table 3.30 Project Area Population Data (2010)

	City of San Jose	City of Milpitas	Census Tract 5045.04	Census Tract 5044.14
Total Residents	945,942	66,790	9,882	5,092
Age 0-17	234,678	15,303	1,681	1,158
Age 18 and over	711,264	51,487	8,201	3,934
Age 20-24	64,386	4,187	855	309
Age 25-34	145,310	10,914	3,009	563
Age 35-49	221,011	16,172	2,639	1,196
Age 50-64	160,244	12,175	1,038	1,185
Age 65 and over	95,242	6,339	410	575
Population Density (people per square mile)	5,710	4,914	-	-

Overall, San Jose and Milpitas' populations are divided among two dominant ethnicities, White and Asian, with less than 5 percent of all other ethnicities present (Table 3.31). The City of Milpitas and both census tracts had a higher presence of Asian community members. Milpitas' Asian community comprises 62 percent of population.

Table 3.31 2010 Ethnicity in the Project Area1

	City of San Jose	City of Milpitas	Census Tract 5045.04	Census Tract 5044.14
White	404,437 (43%)	13,725 (21%)	1,757 (18%)	659 (13%)

Black or African American	30.242 (3%)	1,969 (3%)	553 (6%)	68 (1%)
American Indian or Alaskan Native	8,297 (1%)	309 (0.5%)	60 (0.6%)	3 (<0.1%)
Asian	303,138 (32%)	41,536 (62%)	5,743 (58%)	4,007 (79%)
	City of San Jose	**City of Milpitas**	**Census Tract 5045.04**	**Census Tract 5044.14**
Native Hawaiian and Other Pacific Islander	4,017 (0.4%)	346 (0.5%)	40 (0.4%)	28 (0.6%)
Two or More Races	47,062 (5%)	3,094 (4.6%)	399 (4%)	160 (3%)
[1]Totals not equal to 100% due to omitted categories. Source: U.S. Census Bureau 2010.				

Housing statistics show that the vacancy rate for San Jose is 4.7 percent, which falls below the "natural" or expected vacancy rate for the San Jose market of 5 percent (Table 3.32, City of San Jose 2013a). The median monthly owner cost for housing units with a mortgage in San Jose was $2,860 in 2013, with 78 percent of homeowners paying over $2,000 a month. That cost in in Milpitas was $2,750, and both cities' costs were higher than the national average of $1,559 per month. The vast majority of owner-occupied homes in San Jose and Milpitas were worth more than $500,000 in 2012.

The most recent data from the U.S. Census Bureau reports that the major industries in both San Jose and Milpitas include manufacturing, education services (along with health care and social assistance), and jobs in the professional, scientific, or management categories (see Table 3.33). Other industries of note in the area include retail trade and the arts (including entertainment, accommodation and food services). The California State unemployment rate in December of 2014 was 7.1 percent. In comparison, Milpitas' unemployment rate was only 4.6 percent and San Jose was at 5 percent unemployment (BLS 2015).

Median earnings for civilian employed population of 16 and over in San Jose was $42,978, which was less than the same Milpitas statistic of $49,385.

Table 3.32 Project Area Housing Statistics, 2010

	City of San Jose	**City of Milpitas**	**Census Tract 5045.04**	**Census Tract 5044.14**
Total Housing Units	314,038	19,806	2,749	1,509
Occupied Housing Units	301,366	19,184	2,637	1,451
Owner-Occupied Units	176,216	12,825	1,456	1,227
Renter-Occupied Units	125,150	6,359	1,181	224
Vacant Housing Units	12,672	622	112	58
Source: U.S. Census Bureau 2010.				

Table 3.33 Dominant Industries in the Project Vicinity

2008-2012 American Community Survey 5-Year Estimates	**City of San Jose**	**City of Milpitas**
Civilian Labor Force (16 and over)	458,131	31,622
Agriculture, forestry, fishing, hunting, mining	1,774	50
Construction	27,483	1,021

Manufacturing	86,549	8,824
Wholesale trade	10,302	604
Retail trade	49,965	2,786
Transportation, warehousing, utilities	15,049	900
Information	14,285	786
2008-2012 American Community Survey 5-Year Estimates	**City of San Jose**	**City of Milpitas**
Finance, insurance, real estate	22,743	1,344
Professional, scientific, management	74,306	5,285
Education services, health care, social assistance	83,592	5,558
Arts, entertainment, recreation, accommodation and food services	37,668	2,157
Public administration	11,905	909
Other services, except public administration	22,510	1,398
Source: U.S. Census Bureau 2010.		

3.12.3. Regulatory Setting

3.12.3.1. *Local Plans and Policies*

Limits on development intensity are required by State law. However, jurisdiction to establish limits is given to local municipalities. No other State laws regarding population or housing apply to the proposed project.

CITY OF MILPITAS GENERAL PLAN. The Milpitas General Plan provides guidance and implementing policies related to promoting economic growth and regulating development. Because the proposed project would not directly cause economic or development growth, these policies are not applicable to the proposed project.

SAN JOSE ENVISION 2040 GENERAL PLAN. The San Jose General Plan provides policies guiding future growth. Because the proposed project would not directly cause economic or development growth, these policies are not applicable to the proposed project.

3.12.4. Significance Criteria

The proposed project would have a significant adverse impact on population and housing if it were to:

- **POP-1** Induce population growth in the area, either directly (for example by proposing new homes or businesses) or indirectly (through extension of new roads or infrastructure);
- **POP-2** Displace substantial amounts of existing housing, necessitating the construction of replacement housing elsewhere; or
- **POP-3** Displace substantial amounts of people, necessitating the construction of replacement housing elsewhere.

3.12.5. Potential Impacts

3.12.5.1. *Significance Criteria with No Impact*

The following significance criteria are not discussed further in the EIR because the proposed project would not result in impacts related to these criteria:

POP-2 **Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere.** No housing would be displaced as a result of construction or operation of the project; no access to homes would be temporarily or permanently blocked. The project would increase the area of the creek ROW though acquisition of small areas of land adjoining the existing creek ROW. The lands to be acquired are vacant and do not support residential uses. No removal of residential units would result.

POP-3 **Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere.** Construction would not require residents or businesses to relocate out of the area. The project would increase the area of the creek ROW though acquisition of small areas of land adjoining the existing creek ROW. The lands to be acquired are vacant and do not support residential uses. No removal of residential units would result. No impacts would result and replacement housing would be unnecessary.

3.12.5.2. *Significance Criteria with Potential Impacts*

POP-1 ***INDUCE GROWTH IN THE AREA, EITHER DIRECTLY BY PROPOSING NEW HOMES AND BUSINESSES OR INDIRECTLY (THROUGH EXTENSION OF ROADS OR OTHER INFRASTRUCTURE)***

Less than significant for construction; no impact for operations

CONSTRUCTION (ALL REACHES). The proposed project would provide increased flood protection to the neighboring residents and businesses. For residents and businesses already located in the flood zone, the additional protection would provide reduced risks to health and safety, improved home valuation, and reduced costs for protection and mitigation of flood events. A potential indirect effect is that the reduced risk of flooding could induce growth and housing demand in the area, which could result in increased development. However, most areas immediately surrounding the channel are zoned for industrial or commercial uses and would not be available for residential development. Land uses would continue to be governed by the City of Milpitas and City of San Jose General Plans, which determine zoning and development patterns. Construction of the proposed project may result in a minor and temporary increase in the population if construction workers move to the area, and could increase the numbers of students attending schools in the area. However, under the proposed project, less than 40 workers would be used at any given time, and it is assumed that most of them would commute from nearby communities and would not move their families to the area. Therefore, the proposed project would not indirectly induce growth by providing increased levels of flood protection, and this impact would be less than significant.

The proposed project is anticipated to cost approximately $33 million to design and build. Although the construction contractor would not be required to be from the immediate area, a portion of construction expenditures would be captured by the local and regional economy. The extent to which the regional economy would capture expenditures is a function of the local and regional availability of construction goods and services necessary for this project. Any expenditures not captured regionally may still be captured by other more distant businesses. The local and regional increase in demand for construction goods and services would provide a temporary revenue stream for a variety of businesses, particularly

businesses such as fuel delivery, portable sanitation systems, concrete mixing and installation, and quarries. Expenditures at other types of businesses may increase due to purchases secondary to the construction process, such as purchases of food, fuel, and lodging for construction crews. While local or regional construction expenditures may result in growth of business revenue during the construction period, this impact would be temporary and minor compared to the size of the local and regional economies. Therefore, this impact would be less than significant.

Construction of the proposed project would not result in temporary increases in population in the project vicinity due to relocated construction workers. Less than 40 workers would be used at any given time, and given this small number, they likely would come from the local labor pool and would commute from nearby communities.

OPERATIONS (ALL REACHES). Operations and maintenance of the completed project would not change in ways that could affect population and housing conditions. Therefore, there would be no impact.

3.12.6. Mitigation Measures

There are no measures necessary for reducing impacts to population and housing.

3.12.7. Statement of Impact

Table 3.34 below summarizes the assessment of potential impacts to each of the significance criteria identified above. Impacts would be less than significant, and no mitigation is needed or proposed to offset impacts.

Table 3.34 Statement of Impacts, Population and Housing

Impact	Prior to Mitigation	Applicable Mitigation	After Mitigation
POP-1. Induce substantial population growth or concentration of population in an area, either directly (for example, by proposing new housing and/or businesses), or indirectly (for example, through extension of roads or other infrastructure).	LS	None	LS
POP-2. Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere.	NI	None	NI
POP-3. Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere.	NI	None	NI
NI–No Impact, LS–Less Than Significant, LM–Less Than Significant With Mitigation, S–Significant, SU–Significant and Unavoidable			

3.13. PUBLIC SERVICES

This section identifies public services in the project area and describes potential effects of implementing the proposed project.

3.13.1. Environmental Setting

Residents of Milpitas and San Jose receive the benefits of public and emergency services such as fire departments, police, hospitals, schools, emergency medical responders, parks, libraries, and social service providers. These services are provided by public, private, and non-profit agencies, and are found

in various locations in the surrounding area. The majority of the project area would be served by the City of Milpitas services, while only a small portion of Reach 4 is within the City of San Jose.

3.13.2. Existing Conditions

The project area is in a highly urbanized area within the Cities of Milpitas and San Jose. There are no public service facilities within the project footprint. The public services provided in the vicinity of the project area include:

- City of Milpitas Police Department, 1275 North Milpitas Boulevard, Milpitas, CA 95035
- Milpitas Fire Department, 777 South Main Street, Milpitas, CA 95035
- Milpitas Public Library, 160 North Main Street,, Milpitas, CA 95035
- Emergency Room Services, Regional Medical Center of San Jose, 225 North Jackson Avenue, San Jose, CA 95116
- San Jose Police Department, 201 West Mission Street, San Jose, Ca
- San Jose Fire Department, 1771 Via Cinco De Mayo, San Jose, CA 95132.

There are a number of schools in the vicinity of the proposed project. The two nearest schools (within 0.5 mile) are:

- Northwood Elementary School, 2760 Trimble Road, San Jose, CA 95132
- Calaveras Hills High School, 1331 E. Calaveras Boulevard, Milpitas, CA 95035

Parks and other recreational facilities found in the project vicinity include the Milpitas Community Center and the Teen Center, located on Calaveras Boulevard approximately 0.4 mile west of the project area. Gill Memorial Park is located approximately 0.25 mile south of the project area, and Selwyn Park is located on the other side of I-680 from Upper Berryessa Creek, approximately 0.5 mile from the project area.

3.13.3. Regulatory Setting

3.13.3.1. *Local Plans and Policies*

There are no Federal or State regulations for public services.

CITY OF MILPITAS GENERAL PLAN. The City of Milpitas General Plan provides the following applicable guidance for fire safety:

- 5.c-I-1. Maintain a response time of 4 minutes or less for all urban service areas.

ENVISION SAN JOSE 2040 GENERAL PLAN. The City of San Jose General Plan provides the following applicable guidance:

- ES-3.1 Provide rapid and timely level of service response time to all emergencies.

3.13.4. Significance Criteria

Significant impacts to public services would occur if the proposed project:

PBS-1: Would result in substantial adverse physical impacts associated with the provision of new or physically altered government facilities, or the need for new or physically altered government facilities, the construction of which could cause significant environmental

impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services:

- Fire protection
- Police protection
- Schools
- Parks
- Other public facilities.

3.13.5. Potential Impacts

3.13.5.1. *Significance Criteria with Potential Impacts*

PBS-1 WOULD RESULT IN SUBSTANTIAL ADVERSE PHYSICAL IMPACTS ASSOCIATED WITH THE PROVISION OF NEW OR PHYSICALLY ALTERED GOVERNMENT FACILITIES.

Less than significant for construction: less than significant for operations.

CONSTRUCTION (ALL REACHES). Although project construction would temporarily increase the needs for emergency services (police, fire, and medical), these temporary increases would be minor and not require the provision of new or physically altered government facilities. Therefore, this impact would be less than significant. Construction of the proposed project would not increase the local population. Less than 40 construction workers would be employed at any one time. Given the small numbers of workers, most of whom would be from the local labor pool, the proposed project would not require additional schools to be constructed in the area, and this impact would be less than significant.

OPERATIONS AND MAINTENANCE (ALL REACHES). Completion of the proposed project would result in improvements to safety throughout the project area. Reductions in flood damages would result in less need for public services. Overbank channel roads would be widened and compacted, allowing easier access to emergency vehicles. Steep banks, which are sheer drops to the creek bottom in some locations, would be sloped back to more gentle angles. Aging infrastructure and culverts that inhibit flow capacity would be configured to provide optimum flood conveyance. Ongoing operation and maintenance activities would continue to be guided by District safety regulations and would not result in increased need for emergency services. As described above for Population and Housing (Section 3.12), improved flood protection is not anticipated to induce growth in the area. Therefore, operation of the proposed project would not require the provision of new or physically altered government facilities, and this impact would be less than significant.

MITIGATION. None required. Although not required, Mitigation Measure TRA-A would further ensure that impacts to fire protection, police protection, and emergency medical services would be less than significant.

3.13.6. Statement of Impact

Impacts to public services would be less than significant during construction and operations. A summary of the potential effects is given in Table 3.35.

Table 3.35 Statement of Impacts, Public Services			
Impact	**Prior to Mitigation**	**Applicable Mitigation**	**After Mitigation**
PBS-1. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered government facilities, or the need for new or physically altered government facilities the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services:	--	--	--
Fire Protection	LS	TRA-A	LS
Police Protection	LS	TRA-A	LS
Schools	NI	None	NI
Parks	LS	None	LS
Other Public Facilities (Emergency Medical Services)	LS	TRA-A	LS
NI–No Impact, LS–Less Than Significant, LM–Less Than Significant With Mitigation, S–Significant, SU–Significant			

3.14. RECREATION

This section provides a review of the existing recreational facilities within the project area and larger surrounding cities. Recreational amenities are not part of the proposed project.

3.14.1. Environmental Setting

Few recreational opportunities exist within the project area. The project area may occasionally be used by pedestrians or bicyclists, but its location in an industrial area surrounded by busy streets makes it a less than desirable recreation destination.

3.14.2. Existing Conditions

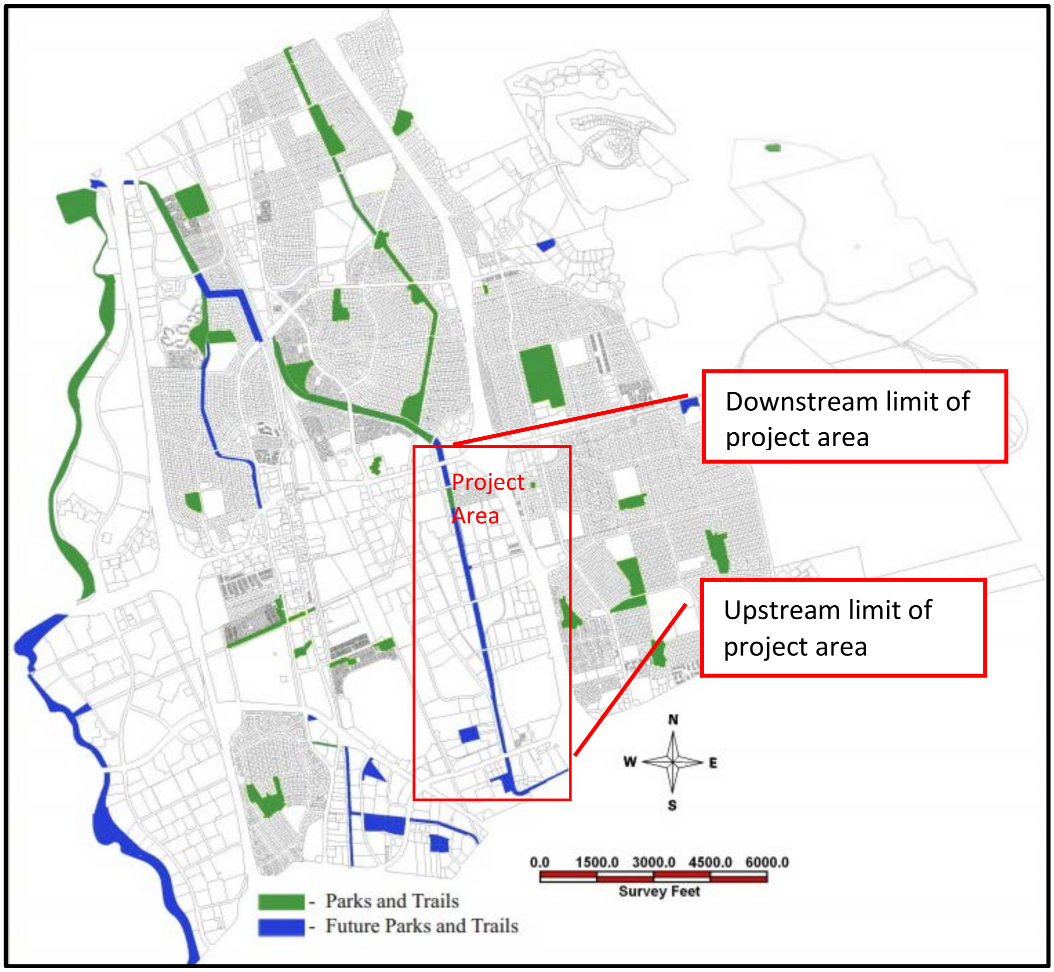
A small local park is present within Reach 2 of the project area adjacent to a residential development on the east bank upstream of Los Coches Street. It has a paved walkway and outdoor fitness equipment located between the immediate top of bank and residential development (Figure 3.16). The existing trail supports noncontact water recreation (REC2), which is designated as a beneficial use of the creek in the San Francisco Basin Plan (SFRWQCB, 2013). Due to the limited amount of water in the creek and the short duration of high flows, boating in the creek is impractical. The lack of fish species that are of interest to anglers discourages fishing. Thus, there are no existing water contact recreational (REC1) uses of the creek within the project area.

City recreational facilities and parks are available throughout the City of Milpitas (1997, 2002, 2010) and City of San Jose (City of San Jose 2007). The Recreation Master Plan for the City of Milpitas indicates that a small portion of the existing creek channel is a recreational park, but that the entire length of the creek is proposed for inclusion in the City park system in the future (Figure 3.17). Land use mapping in Section 3.10 (Figure 3.14) shows that much of the area is zoned for open space, though it is currently not developed for park or recreational use. There are no parks or recreational facilities within the portion of Reach 4 which lies within the City of San Jose.

Figure 3.16 Looking Downstream toward Los Coches Street and Pocket Park

The entire length of the project area from I-680 to Calaveras Boulevard is designated to become part of the existing Berryessa Creek City Trail in the future (City of Milpitas 1997, 2010). The Berryessa Creek City Trail does not currently pass through the project area. It extends 4.5 miles from Penitencia Creek to I-680, upstream of the project area, and picks up again downstream of Calaveras Boulevard and extends north to Abel Street downstream of the project area. The Berryessa Creek City Trail connects numerous residential areas to schools, shopping, and employment centers. The Trail follows the top of access roads that are present on one or both sides of Upper Berryessa Creek, which were included as part of the original Authorized Project for the primary purposes of operation and maintenance of Upper Berryessa Creek channel. According to the Milpitas Trails Master Plan (1997), City trails are intended to provide opportunities for multiple use and should be developed to meet Caltrans standards for Class I bikeways, with a minimum trail width of 10 feet. Currently, the project area is closed to recreational use via locked gates at most overpasses and no trespassing signs are posted. However, commercial and business parks with adjacent properties are not always fenced or gated and limited pedestrian and bicycle use was observed within the project right-of-way during field visits.

At the time of preparation of the Recreation and Parks Master Plan in 2010, and based on household population, the City of Milpitas was achieving the standard set by the City of Milpitas General Plan (2002) of 3 acres of public parkland for every 1,000 residents. The City of Milpitas contains approximately 185 acres of developed City parkland and other recreational facilities, which include 33 parks, several miles of trails, five community service buildings, a dog park, and a sports complex with swimming pools and gymnasium (City of Milpitas 2010). Additional recreation opportunities are provided by the Milpitas Unified School District, which allows mutual use of ball fields, pools, and other sports fields. The nearest city park to the project area is Creighton Park, east of I-680 and nearly 1 mile away by foot.



Source: City of Milpitas 2010

Figure 3.17 City of Milpitas Existing and Future Recreational Features

3.14.3. Regulatory Setting

3.14.3.1. *Local Plans and Policies*

There are no State or Federal parks or other State or Federally managed recreational facilities in or near the project area. Therefore, no State or Federal laws, regulations, or codes regarding recreational resources apply to the project.

CITY OF MILPITAS GENERAL PLAN. The City of Milpitas General Plan includes principles and policies regarding the protection and development of parks and recreational facilities (City of Milpitas 2002), including the following:

- 4.a-I-1. Provide 5 acres of neighborhood and community parks for every 1,000 residents outside of the Midtown Specific Plan Area, and 3.5 acres of special use parks for every 1,000 residents within the Midtown Specific Plan Area.

MILPITAS TRAILS MASTER PLAN AND BIKEWAY MASTER PLAN AND UPDATE. The City of Milpitas Trails Master Plan includes the development of 37 acres of trails and plans to interconnect trails with on-street connectors (City of Milpitas 1997). The plan identifies trail types and specific corridors including regional

trails, City trails, neighborhood trails, and on-street connectors (City of Milpitas 2010), and describes goals, objectives, and development priorities for bicycle transportation and recreation. Included in the plan are goals and objectives to increase bicycle use within the City both for recreation and as transportation. Goals include increasing accessibility to schools, parks, and community amenities. The goals and objectives in the plan are consistent with the City of Milpitas General Plan's guiding principle of providing a comprehensive system of sidewalks, bicycle lanes and routes, and off-street trails that connects all parts of the City (City of Milpitas 2010). Both plans call for the future utilization of the Upper Berryessa Creek access roads to become part of the City's Class I Bikeway.

ENVISION SAN JOSE 2040 GENERAL PLAN. The plan includes the following guidelines:

- PR-7.1 Encourage non-vehicular transportation to and from parks, trails, and open spaces by developing trail and other pleasant walking and bicycle connections to existing and planned urban and suburban parks facilities.
- CD-3.2 Prioritize pedestrian and bicycle connections to transit, community facilities (including schools), commercial areas, and other areas serving daily needs. Ensure that the design of new facilities can accommodate significant anticipated future increases in bicycle and pedestrian activity.

3.14.4. Significance Criteria

A significant impact would occur to recreation if the proposed project would:

REC-1 Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or would be accelerated; or,

REC-2 Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment.

3.14.5. Potential Impacts

3.14.5.1. *Significance Criteria with No Impact*

The following significance criteria are not discussed further in the EIR because the proposed project would not result in impacts related to these criteria:

REC-2 **Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment** - The proposed project does not include recreational facilities, and would not induce growth that would require the construction or expansion of recreational facilities.

3.14.5.2. *Significance Criteria with Potential Impacts*

REC-1 ***INCREASE THE USE OF EXISTING PARKS OR OTHER RECREATIONAL FACILITIES SUCH THAT SUBSTANTIAL PHYSICAL DETERIORATION OF THE FACILITY WOULD OCCUR OR BE ACCELERATED***

Less than significant for construction; less than significant for operations

CONSTRUCTION (REACHES 1–3). The existing channel access roads receive unauthorized use by small numbers of pedestrians and bicyclists. A small neighborhood pocket park just upstream of Los Coches Street on the right (east) bank and about 460 linear feet of adjoining paved recreational trail would be

removed in order to construct the proposed widened trapezoidal channel and access roads. The District consulted with the City of Milpitas about relocation of the exercise equipment at the pocket park, but no areas suitable for relocation are present in the vicinity; therefore the equipment would not be relocated or replaced. This impact would be less than significant because the equipment receives minimal use and the section of trail to be removed is relatively short and receives minimal use. ~~Increased use on other recreational facilities would be minimal and less than significant.~~

Construction activities would also prevent access to the creek for non-contact recreational uses (Beneficial Use REC2) and generate noise and visual impacts that would potentially degrade the recreational experience. However, only portions of the creek would be under construction at any one time, and such recreational use of the creek would continue in the areas not under active construction. The temporary disruption of non-contact recreational use of the creek at a particular location would last for less than two years and would be a less than significant impact.

As described in Section 3.14.2, there is no existing water contact recreational use (Beneficial Use REC1) uses of the creek within the Reaches 1 through 3 due to the limited amount of water in the creek and the lack of fish species that are of interest to anglers. The propose project would not adversely affect existing or ongoing REC1 beneficial uses. This impact would be less than significant.

CONSTRUCTION (REACH 4). There are no parks or other recreational facilities in the construction footprint in Reach 4, nor would construction restrict accessibility of any parks; therefore, there is no impact in Reach 4. There are no existing water contact recreational (REC1) beneficial uses of the creek within Reach 4. The proposed project would not adversely affect existing REC1 or REC2 beneficial uses in Reach 4. This impact would be less than significant.

OPERATIONS (ALL REACHES). After construction is complete, the project would permanently remove the existing pocket and short section of trail upstream of Los Coches Creek, which provide REC2 opportunities. However, these amenities receive minimal use and impacts would be less than significant.

MITIGATION (NOT REQUIRED). Although mitigation is not required because Impact REC-1 is less than significant, implementation of Mitigation Measures REC-A and LND-A (Allow public access to the creek ROW) would further reduce the expected less than significant impacts to recreation features.

3.14.6. Mitigation Measure

REC-A: PREPARE AND PROVIDE DETOUR SIGNAGE FOR PEDESTRIANS AND CYCLISTS. Although mitigation measures are not required, the District, working with the USACE, will require the construction contractor to implement the following measures. In order to mitigate the effects of displacing the unauthorized use of the access roads by pedestrians and cyclists, signs would be placed identifying the duration of construction and potential detour routes.

SIGNIFICANCE AFTER MITIGATION. Potential impacts with mitigation would remain less than significant.

3.14.7. Statement of Impact

Table 3.36 summarizes the level of potential impacts associated with recreational features of the project area. Impacts would be less than significant.

Table 3.36 Statement of Impacts, Recreation			
Impact	**Prior to Mitigation**	**Applicable Mitigation**	**After Mitigation**
REC-1. Increase the use of existing parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.	LS	REC-A	LS
REC-2. Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment.	NI	None	NI
NI–No Impact, LS–Less Than Significant, LM–Less Than Significant With Mitigation, S–Significant, SU–Significant and Unavoidable			

3.15. TRAFFIC AND TRANSPORTATION

This section describes transportation facilities in the vicinity of Upper Berryessa Creek, including roadways, transit service, and pedestrian and bicycle routes. This section also provides results of a traffic study that was prepared for this project, which describes existing traffic conditions and those predicted to occur during the construction period (Kittelson 2012). Section 3.15.6 addresses potential effects from construction and operations, including potential impacts on transportation facilities that are adjacent to or within the construction area and which could be affected by construction, as well as roads and streets that construction workers, materials delivery, and haul trucks could use to access and exit construction areas. If project-related impacts are found to exceed thresholds of significance, mitigation measures are identified.

3.15.1. Environmental Setting

The project area is located within the city limits of Milpitas and San Jose. Surrounding roadways include Calaveras Boulevard at the northern project boundary, Milpitas Boulevard to the west and I-880 further west, and I-680 at the southern project boundary. Surface streets serving residential and industrial areas are found to the east of the project area. UPRR tracks run parallel to the stream on the east bank in Reach 3, and a spur line crosses the creek and runs for a short distance on the west side of the creek in Reach 2. The roadway network that would be used for access for construction workers and construction vehicles consists of regional highways and local roadways. Figure 3.18 shows the roadways in the project vicinity.

3.15.2. Existing Conditions

Traffic conditions, including traffic counts on Calaveras Boulevard, Los Coches Street, Yosemite Drive, Ames Avenue, and Montague Expressway, were summarized in an Existing Conditions Report for Traffic Analysis (Dowling 2008). Traffic conditions were analyzed in a Traffic Analysis Report prepared for Alternative 2A (Kittelson 2012). Much of the data from that report is relevant to this alternative, although Alternative 2A contains substantial measures including bridge replacements, full closure of Los Coches Street, and lane closures on Calaveras Boulevard and Montague Expressway that would not occur under the proposed project. Data from the Existing Conditions Report and the Traffic Analysis Report and other sources are summarized below.

3.15.2.1. *Roadways*

Roadways in Santa Clara County are classified based on their function and linkages, reflecting their importance to land use patterns, travelers, and general welfare. The system also recognizes differences between urban, suburban, and rural areas.

FREEWAYS. Operated and maintained by Caltrans, these facilities are designed as high volume, high-speed facilities for intercity and regional traffic. Access to these facilities is limited, and in some cases on- and off-ramps are metered during peak-hour periods to reduce congestion caused by merging cars and trucks. Three freeways or connectors serve the project area. All three may also serve as truck routes during construction of the proposed project.

- I-880 is a six-to-eight-lane, north-south freeway 1.5 miles west of the Upper Berryessa Creek project area. It connects the Cities of Milpitas and San Jose with regional destinations such as Oakland and Fremont on the north and Campbell on the south. The average daily traffic on I-880 in the vicinity of SR 237 is 133,000 to 174,000 vehicles per day (Kittelson 2012). I-880 has interchanges with Calaveras Boulevard (SR 237), Montague Expressway, and Great Mall Parkway near the project area.
- I-680 is an eight-lane, north-south freeway that runs parallel to I-880. I-680 connects the Cities of Milpitas and San Jose on the south to regional destinations such as Fremont on the north and the Pleasanton-Livermore Tri-Valley area to the northeast. In the vicinity of the Upper Berryessa Creek study area, I-680 has interchanges with SR 237 and the Montague Expressway. The average daily traffic on I-680 near SR 237 is 147,000 to 152,000 vehicles per day (Kittelson 2012). Upper Berryessa Creek passes beneath I-680 in a culvert at the upstream (southern) boundary of the project area. At the northern end of the project area, I-680 is approximately 1,000 feet east of the creek.
- Calaveras Boulevard or SR 237 is a major east-west State highway and signalized arterial roadway in the City of Milpitas, east of I-880. It runs for approximately 1.5 miles from I-880 on the west to I-680 on the east and serves as a regional freeway-to-freeway connector. It is a four-to-six-lane road fronted mostly by retail and commercial uses. It continues east of I-680 to join Piedmont Road. The average daily traffic on SR 237 is 126,000 to 131,000 vehicles per day near its interchange with I-680 (Kittelson 2012). Upper Berryessa Creek passes beneath Calaveras Boulevard at the downstream (northern) boundary of the project area.

ARTERIALS. Major Arterials (four to eight lanes) and Minor Arterials (four lanes) are the principal network for through-traffic within a community and often between communities.

- Montague Expressway is a six-to-eight-lane, east-west arterial in the Cities of Milpitas and San Jose. It runs for approximately 1.6 miles between I-880 and I-680, and intersects the project area between Reaches 3 and 4. Montague Expressway has signalized intersections at South Main Street/Oakland Road, McCandless Drive/Trade Zone Boulevard, Great Mall Parkway/East Capitol Avenue and South Milpitas Boulevard. During the morning peak period (AM Peak Period) from 6 a.m. to 9 a.m., one westbound through lane is restricted for high-occupancy vehicle (HOV) use; during the afternoon peak period (PM Peak Period) from 3 p.m. to 7 p.m., one eastbound lane is restricted for HOV use. The HOV lanes are located east of the I-880 interchange and continue until just west of the I-680 interchange. The HOV lanes are currently in a 3-to-5-year trial period, but it is assumed they will still be in operation in 2017 when the Upper Berryessa Creek modifications take place.
- Santa Clara County Roads and Airports Department, Santa Clara Valley Transportation Authority, and Santa Clara Valley Water District have completed plans to widen Montague Expressway

near the new Bay Area Rapid Transit (BART) station, which is under construction at the corner of Montague and Great Mall Boulevard/Capitol Avenue. The county project would widen Montague Expressway from six to eight lanes and replace the bridge over Upper Berryessa Creek. Work would begin with utility relocations in the spring or summer of 2016.

- Great Mall Parkway is a major six-lane, east-west arterial roadway in the City of Milpitas. It provides access to the Great Mall and the Great Mall Transit Center, located west of the project area. It forms a signalized intersection with Montague Expressway. Milpitas Boulevard is a four-lane north south minor arterial roadway that joins Dixon Landing Road on the north and ends at Montague Expressway on the south. As part of the BART Silicon Valley Extension project, Milpitas Boulevard would be extended south of Montague Expressway to connect to Great Mall Boulevard.
- Cropley Avenue is a two-to-four-lane, east-west minor arterial roadway in the City of San Jose, located about a quarter mile south of the project area. Cropley Avenue primarily serves residential areas. It forms a four-lane overpass over I-680 and a signalized intersection with Morrill Avenue.
- Jacklin Road is an east-west minor arterial 1 mile north of the project area. It has four lanes and functions as a continuation of Abel Road from Milpitas Boulevard to an interchange at I-680. It continues east until it turns into Evans Road.
- Abel Road is a four-lane, north-south minor arterial in the City of Milpitas, 1 mile west of the project area. It links up with Main Street in the south and becomes Jacklin Road at Milpitas Boulevard in the north. Major signalized intersections include Milpitas Boulevard, Calaveras Boulevard, and Great Mall Parkway.
- Trade Zone Boulevard is a four-lane, east-west connector linking Montague Expressway with N. Capital Avenue. It becomes Cropley Avenue east of N. Capital Avenue. Its closest proximity to the project area is about 0.5 mile to the south.

COLLECTORS. These two-lane facilities function as the main interior streets within neighborhoods and business areas. Collectors serve to connect these areas with higher classification roads (i.e., arterials, expressways, and freeways).

- Main Street is a two-to-four-lane collector roadway that links Abel Street to the north and Oakland Road to the south between Great Mall Parkway and Montague Expressway. It is located over 1 mile west of the project corridor and would not be affected by the proposed project.
- Morrill Avenue/S Park Victoria Drive is a two-lane major collector roadway with a center two-way left turn lane. It is fronted primarily by residential uses on both sides and is located east of I-680. This segment would not be affected by the proposed project.
- Yosemite Drive is a four-lane minor collector roadway that joins Piedmont Road on the east and curves into Gibraltar Drive on the west. It provides access to residential areas in east Milpitas and offices west of I-680. It intersects the stream channel in Reach 2, and carries up to 598 peak hour vehicles as of 2008 (Dowling 2008).

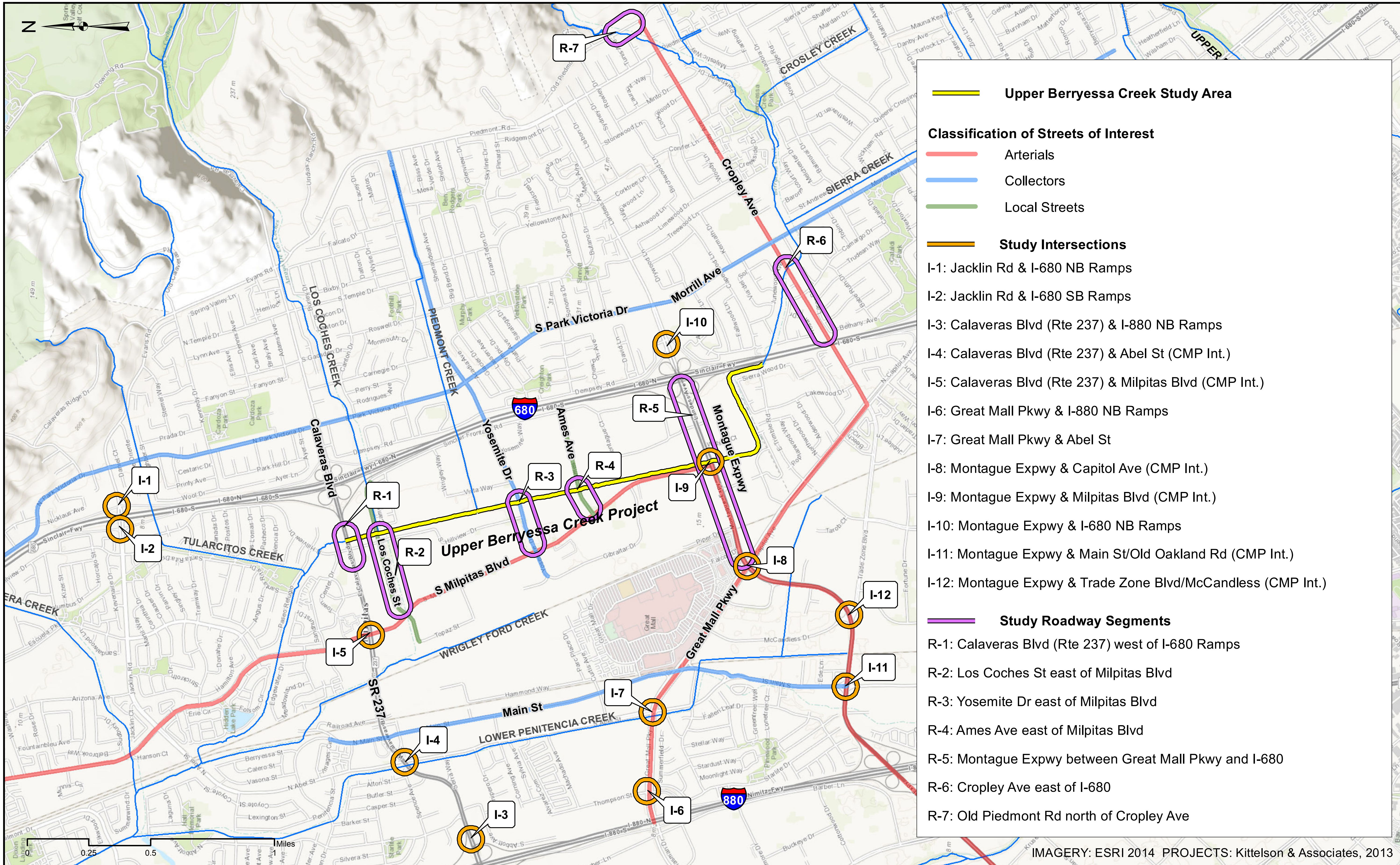


Figure 3.18 Study Intersections and Roadway Segments

Tetra Tech
17885 Von Karman Avenue, Suite 500
Irvine, CA 92614
Tel. (949) 809-5000 Fax. (949) 809-5003

Santa Clara Valley Water District

UPPER BERRYESSA CREEK
FLOOD RISK MANAGEMENT PROJECT

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LOCAL STREETS. These facilities are two-lane streets that provide local access and service. They include residential, commercial, industrial, and rural roads.

- Los Coches Street is a two-lane local street that joins Milpitas Boulevard to the west of the project area and curves to become Sinclair Frontage Road east of the project area. It intersects the stream channel in Reach 1.
- Ames Avenue is a two-lane local street that provides access to the Ames Industrial Park including technology companies. It joins Sinclair Frontage Road east of the project area and Milpitas Boulevard west of the project area. It intersects the stream channel in Reach 2.

3.15.2.2. *Roadway Level of Service*

Level of Service (LOS) calculations are the standard method used by transportation engineers and government agencies to compare traffic volumes with a given roadway's design capacity. LOS reflects speed and travel time, freedom to maneuver, traffic interruptions, comfort, and convenience. There are six LOS categories as shown in Table 3.37.

Table 3.37 Descriptions of Levels of Service

Level of Service	Description of Traffic Conditions
A	Conditions of free flow; speed is controlled by drivers' desires, speed limits, or roadway conditions.
B	Conditions of stable flow; operating speeds beginning to be restricted; little or no restrictions on maneuverability from other vehicles.
C	Conditions of stable flow; speeds and maneuverability more closely restricted; occasional backups behind left-turning vehicles at intersections.
D	Conditions approach unstable flow; tolerable speeds can be maintained but temporary restrictions may cause extensive delays; little freedom to maneuver; comfort and convenience low; at intersections, some motorists, especially those making left turns, may wait through more than one or more signal changes.
E	Conditions approach capacity; unstable flow with stoppages of momentary duration; maneuverability severely limited.
F	Forced flow conditions; stoppages for long periods; low operating speeds.

Source: Highway Capacity Manual. Transportation Research Board, Washington, D.C. 2000

LOS standards differ by jurisdiction. Caltrans aims for a LOS of C or D but acknowledges that this may not always be attainable. In such cases, the aim is to not worsen the existing condition (Kittelson, 2012). In the City of Milpitas, projects affecting roadways east of I-880 with an existing LOS of F must provide mitigation if they increase traffic volumes by more than 1 percent (City of Milpitas, 2002). The City of San Jose aims for an overall LOS of D during peak periods (City of San Jose, 2011).

As part of the USACE GRR-EIS completed for this project (USACE 2014), a number of intersections in and near the project area were analyzed to determine LOS under normal conditions. The intersections studied and the resultant LOSs are shown in Table 3.38.

Table 3.38 Existing Intersection Level of Service and Average Delay, AM and PM Peak Periods*				
Intersection	**AM Peak**		**PM Peak**	
	LOS	**Delay (seconds per vehicle)**	**LOS**	**Delay (seconds per vehicle)**
Jacklin Rd. & I-680 Northbound Ramps	N/A		B	16.2
Jacklin Rd. & I-680 Southbound Ramps	N/A		B+	11.5
Calaveras Blvd. & I-880 Northbound Ramps	B	12.6	B	16.8
Calaveras Blvd. & Abel St.	D+	38.1	D	44.1
Calaveras Blvd. & Milpitas Blvd.	D	40.2	D	44.1
Great Mall Pkwy. & I-880 Northbound Ramps	C	27.1	C+	20.3
Great Mall Pkwy. & Abel St.	D	40.7	D+	36.7
Montague Exp. & Capitol Ave.	D	49.7	E+	56.6
Montague Exp. & Milpitas Blvd.	D	39.6	D+	35.1
Montague Exp. & I-680 Northbound Ramps	D	40.5	D	46.2
Montague Exp. & Main St./Old Oakland	E	68.1	D-	54.8
Montague Exp. & Trade Zone Blvd.	F	94.8	F	81.4
*Source: Kittelson 2012.				

3.15.2.3. *Transit Service*

Santa Clara Valley Transportation Authority (VTA) operates local and regional transit services in the study area. Figure 3.19 shows transit routes in the immediate project area.

- Route 46 operates between the Great Mall transit center and the Milpitas High School. The route uses Montague Expressway, Calaveras Boulevard (east of the project), and Jacklin Road. On weekdays, it operates from 6 a.m. to 7 p.m. at frequencies of 30 (peak) to 60 (midday) minutes. On Saturdays, it operates from 9 a.m. to 6 p.m. at frequencies of 60 minutes. There is no service on Sundays. It crosses Upper Berryessa Creek at Montague Expressway east of Milpitas Boulevard.
- Route 47 operates between the Great Mall transit center and the McCarthy Ranch Shopping Center via Montague Expressway, Park Victoria, and Calaveras Boulevard. On weekdays, it operates from 6 a.m. to 10 p.m. at frequencies of 30 minutes. On Saturdays, it operates from 8 a.m. to 8 p.m. at frequencies of 30 minutes. On Sundays, it operates from 9 a.m. to 7 p.m. at frequencies of 45 minutes. It crosses Upper Berryessa Creek at Calaveras Boulevard west of I-680 and Montague Expressway east of Milpitas Boulevard.
- Route 70 operates between the Great Mall transit center near Great Mall Parkway in Milpitas and the Capitol light-rail transit station near Capitol Expressway in San Jose. On weekdays, it operates from 5 a.m. to 11 p.m. at frequencies of 15 minutes (less frequent in evenings). On weekends, it operates from 6 a.m. to 10 p.m. at frequencies of 20 minutes. It crosses Upper Berryessa Creek at Montague Expressway just east of Milpitas Boulevard and Morrill Avenue south of Cropley Avenue.
- Route 71 operates between the Great Mall transit center near Great Mall Parkway in Milpitas and the Eastridge Transit Center near Capitol Expressway in San Jose. On weekdays, it operates from 5 a.m. to 10 p.m. at frequencies of 15 (peak) to 30 (midday, evening) minutes. On Saturdays, it operates from 7 a.m. to 9 p.m. at frequencies of 30 minutes. The Sunday schedule shows it operating every 45 minutes from 7 a.m. to 9 p.m. The route crosses Upper Berryessa Creek at Montague Expressway east of Milpitas Boulevard and Piedmont Road south of Cropley Avenue.

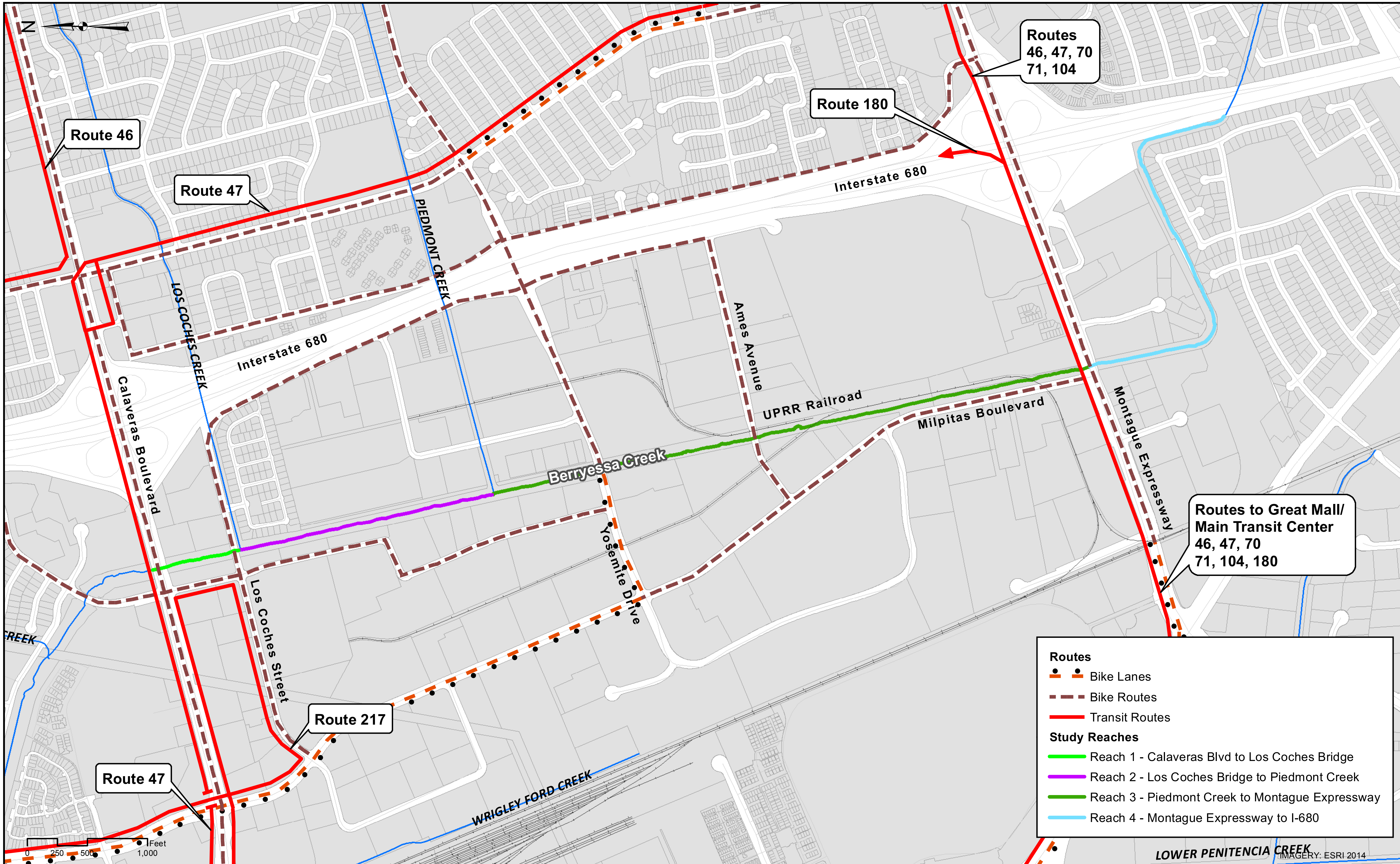

Figure 3.19 Transit and Bike Routes

Tetra Tech
17885 Von Karman Avenue, Suite 500
Irvine, CA 92614
Tel. (949) 809-5000 Fax. (949) 809-5003

Santa Clara Valley Water District

UPPER BERRYESSA CREEK
FLOOD RISK MANAGEMENT PROJECT

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- Route 104 - Express operates between Deer Creek Road in Palo Alto and the Penitencia Creek Transit Center south of Berryessa Road in San Jose. On weekdays, two trips provide westbound service—from Penitencia Creek to Deer Creek—during the AM Peak, from 6 a.m. to 8 a.m. Two eastbound trips are offered in the PM Peak between 4 p.m. and 6 p.m. The route crosses over Upper Berryessa Creek at Montague Expressway and Milpitas Boulevard.
- Route 180 - Express operates between the Fremont BART station and the Great Mall Transit Center (several peak hours trips continue to the Eastridge Transit Center and San Jose). On weekdays, it operates from 6 a.m. to 10 p.m. at frequencies of 30 minutes. No weekend service is operated on this route. Route 180 crosses over Upper Berryessa Creek at Montague Expressway east of Milpitas Boulevard.
- AC Transit Route 217 connects the Fremont BART with the Great Mall Transit Center. On weekdays, it operates from 5 a.m. to 11 p.m. at frequencies of 30 minutes. On weekends, it operates from 7 a.m. to 8 p.m. at 40 minute headways. In the general project area, the route is closest to Upper Berryessa Creek at Calaveras Boulevard and S. Hillview Drive.

Regional and local light rail transit (LRT) service is also provided by VTA through the Alum Rock LRT line with the nearest station at Montague Expressway and N. Capital Boulevard. The proposed VTA Bus Rapid Transit (i.e., Valley Rapid) would not serve the study area. A BART station at Montague Expressway and Capitol Avenue is under construction and should be completed by 2018, providing service on two lines along the East Bay, with one line to Richmond and the other into San Francisco and Daly City. Depending on the exact construction schedule, the modifications at Upper Berryessa Creek may coincide with BART's construction efforts.

3.15.2.4. *Railroads*

A UPRR trestle passes over Upper Berryessa Creek just north of Montague Expressway. The track then serves several properties to the east of the creek, linking them with the rest of the UPRR system to the west. The UPRR also crosses Upper Berryessa Creek on a box culvert south of Ames Avenue. That crossing serves an industrial lead track that terminates south of Los Coches Street.

3.15.2.5. *Non-Motorized Facilities*

Informal pedestrian and bicycle paths and trails are located along the creek within the project area, and formal paths are found in the immediate vicinity along much of the alignment. The access roads are often used by area residents for walking, jogging, and running, though access is restricted in some locations. A number of streets in both cities have designated bike routes and most of the major streets have sidewalks on one or both sides of the street. Figure 3.19 shows designated bike lanes and bike routes in the immediate project area.

3.15.3. **Regulatory Setting**

3.15.3.1. *Federal Regulations*

TITLE 23 OF THE U.S. CODE. Federal statutes specify the procedures that the U.S. Department of Transportation must follow in setting policy regarding the placement of utility facilities within the rights-of-way of roadways that receive Federal funding. These roadways include expressways, most State highways, and certain local roads. In addition, 23 USC 116 requires State highway agencies to ensure proper maintenance of highway facilities, which implies adequate control over non-highway facilities,

such as utility facilities. Finally, 23 USC 123 specifies when Federal funds can be used to pay for the costs of relocating utility facilities in connection with highway construction projects.

TITLE 23 OF THE CODE OF FEDERAL REGULATIONS. Federal Highway Administration (FHWA) regulations require that each State develop its own policy regarding the accommodation of utility facilities within the rights-of-way of such roads. After FHWA has approved a State's policy, the State can approve any proposed utility installation without referral to FHWA, unless utility installation does not conform to the policy. Federal regulations do not dictate specific levels of operation or minimum delays, however, which are primarily established by local jurisdiction.

3.15.3.2. *State Regulations*

CALIFORNIA STREETS AND HIGHWAYS CODE. The California Streets and Highways Code authorizes Caltrans to control encroachment within State highway rights-of-way. Encroachments allow temporary or permanent use of a highway right-of-way by a utility, a public entity, or a private party. Caltrans controls encroachment by requiring an encroachment review and permit for any project that may affect a State roadway.

Caltrans's Right of Way and Asset Management Program is primarily responsible for acquisition and management of property required for State transportation purposes. Transportation purposes may include highways, mass transit guideways and related facilities, material sites, and any other purpose that may be necessary for Caltrans operations. The responsibilities of the Right of Way and Asset Management Program include managing Caltrans' real property for transportation purposes, reducing the costs of operations, disposing of property no longer needed, and monitoring right-of-way activities on Federally-assisted local facilities.

Caltrans' target level of service is at the transition between LOS C and LOS D on State highways (Caltrans 2010). They acknowledge that this target may not always be possible and recommend that lead agencies consult with them concerning the appropriate LOS target. Projects should not worsen existing LOS levels if already below the target.

3.15.3.3. *Local Plans and Policies*

SANTA CLARA VALLEY TRANSPORTATION AGENCY CONGESTION MANAGEMENT PLAN. The Santa Clara Valley Transportation Agency (VTA) is designated as Santa Clara Valley's Congestion Management Agency (VTA 2014). The Congestion Management Program (CMP) statute requires that uniform methods be used for evaluating transportation impacts of land use decisions on the CMP system, and establishes guidelines for preparing Transportation Impact Analysis (TIA) and to assist in identifying improvements to minimize a development project's impacts. VTA's Transportation Impact Analysis Guidelines (VTA 2014) require that agencies:

1. Use the VTA *TIA Guidelines* to evaluate the transportation impacts of all land use decisions within the agency's jurisdiction that are projected to generate 100 or net new weekday (AM or PM peak hour) or weekend peak hour trips, including both inbound and outbound trips.
2. Submit a copy of the TIA Report to VTA at least 20 calendar days before the development decision or recommendation is scheduled by the agency.

The LOS standard for designated roadways and intersections in the Santa Clara County Congestion Management Plan (CMP) network is LOS E, except for facilities grandfathered in at LOS F (VTA 2013). CMP-designated roadways in the program vicinity include I-680, I-880, SR 237, and Montague Expressway (Kittelson 2012). CMP-designated intersections include Calaveras Boulevard (SR 237) / Abel Street, Calaveras Boulevard (SR 237) / Milpitas Boulevard, Montague Expressway / Milpitas Boulevard, Montague Expressway / Capitol Avenue, Montague Expressway / Main Street, and Montague Expressway / Trade Zone Boulevard (Kittelson 2012).

CITY OF MILPITAS MASTER PLAN. The Milpitas Master Plan, citing the Santa Clara County Congestion Management Plan (CMP), established that the basic traffic LOS goal is E. For locations with a baseline LOS F, the LOS goal remains F.

The Circulation Elements of the Master Plan designates "the general location and extent of existing and proposed major thoroughfares, transportation routes and other local public facilities." Since the original issuance of the Master Plan in 1994, the City of Milpitas has issued several specific plans, especially addressing transportation issues. These plans include the Streetscape Master Plan (2000), Bikeway Master Plan (2009), and the Trails Master Plan (1997). These plans emphasize the importance of non-motorized transportation with the City and provide supportive policies and actions.

The City of Milpitas *Municipal Code* enforces rules, regulations, and requirements pertaining to operations and maintenance of the transportation network within its respective jurisdiction. According to the *Code*, designated truck routes are to be utilized for any goods movement, and any vehicle exceeding a maximum gross weight limit of three tons, the Chief Police Officer is authorized to designate such street or streets by appropriate signs as "Truck Traffic Routes" for the movement of vehicles exceeding a maximum gross weight limit of three tons.

For any work within a City-owned right-of-way (ROW), an encroachment permit must be filed with the Milpitas Department of Engineering. General provisions of the encroachment permit require the permittee to repair or replace existing roadways, to notify the Public Works Inspector at least 48 hours prior to any work, and to abide by the California Department of Transportation Manual of Traffic Controls for Construction and Maintenance Work. Encroachment permits may be required from the VTA as well.

SAN JOSE ENVISION 2040 GENERAL PLAN. The transportation policies contained in Envision San Jose 2040 include a "set of balanced, long-range, multimodal transportation goals and policies that provide for a transportation network that is safe, efficient, and sustainable…" The policies and actions outlined in the plan aim to:

- Establish circulation policies that increase bicycle, pedestrian, and transit travel, while reducing motor vehicle trips, to increase the City's share of travel by alternative transportation modes; and
- Promote San Jose as a walking- and bicycling-first City by providing and prioritizing funding for projects that enhance and improve bicycle and pedestrian facilities.

Policy TR-5.3 in Envision San Jose 2040 states that the "minimum overall roadway performance during peak travel periods should be level of service 'D' except for designated areas."

3.15.4. Significance Criteria

Impacts related to transportation and circulation would be significant if the project would:

TRA-1 Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to streets, highways and freeways, pedestrian and bicycle paths, and mass transit;

TRA-2 Conflict with an applicable congestion management program, including but not limited to, level of service standards and travel demand measures, or other standards established by the County congestion management agency for designated roads or highways;

TRA-3 Result in change in air traffic patterns including either an increase in traffic levels or a change in location that results in substantial safety risks;

TRA-4 Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or construction traffic;

TRA-5 Result in inadequate emergency access; or

TRA-6 Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

3.15.5. **Potential Impacts**

3.15.5.1. *Significance Criteria with Potential Impacts*

TRA-1 CONFLICT WITH AN APPLICABLE PLAN, ORDINANCE, OR POLICY ESTABLISHING MEASURES OF EFFECTIVENESS FOR THE PERFORMANCE OF THE CIRCULATION SYSTEM

Less than significant with mitigation for construction; less than significant for operations

CONSTRUCTION (REACHES 1–3). During project construction, trucks importing building materials or exporting excavated materials would access temporary construction staging areas and access roads on both sides of the channel. These areas would primarily be used for material storage and vehicle parking when work is occurring in the immediate area. Starting at the upstream end of the project, the first proposed staging site in Reaches 1–3 is located on the east side of the creek 800 feet downstream of Montague Expressway. Access to this staging area and egress from it would be via Ames Avenue and the maintenance road on the east side of the creek. The next staging area is west of the creek and on the south side of Yosemite Drive. Access and egress would be from Yosemite Drive. The northernmost site is located on the west side of the creek and just south of Los Coches Street. Access would be from Los Coches Street or from upstream areas via the access road. Trucks may exit the staging areas and access roads via Calaveras Boulevard, Los Coches Street, Yosemite Drive, or Ames Avenue.

Up to 74,500 cy of materials would be excavated in Reaches 1–3. If all of this material were disposed of off-site, this would result in approximately 4,781 truckloads of material, or approximately 40 trips (20 round trips) per day. There would be an additional six to eight daily truck trips for importing materials including concrete, steel reinforcing bar, and topsoil, as well as construction equipment. Assuming 10-hour work days, approximately 5 trucks per hour would either enter or exit the access roads and staging areas. These trucks would enter or exit at multiple points, so the effects would be spread throughout Reaches 1–3. If concentrated at one location, these additional truck trips would constitute only 2/10 of 1 percent of peak hour traffic on Calaveras Boulevard or Montague Expressway. Due to the low numbers of trucks entering the roadway per hour, LOS on local and regional roadways and at intersections is not likely to be affected. Additional temporary and intermittent delays to the smooth flow of traffic may occur when slow-moving construction trucks impede faster-moving passenger vehicles. Because this type of impedance to traffic flow during the weekday peak traffic hours is less predictable than

temporary lane closures on side streets, and would occur over the course of the construction period, it would be a short-term significant impact.

No lane closures would occur on Calaveras Boulevard. Due to trucks entering or exiting the access roads, temporary lane closures lasting for up to 10 days would occur on Los Coches Street, Ames Avenue, and Yosemite Drive. These lane closures would not be concurrent. These closures would result in traffic delays during peak times. Partial closures of Los Coches Street and Yosemite Avenue would not require diversion of traffic to other streets, but even if diversion of a significant portion of traffic on these streets occurred, Los Coches Street would be at worst LOS D, and Yosemite Drive would be at worst LOS E (Dowling, 2008), which is consistent with the City of Milpitas basic traffic LOS goal of E. Partial closure of Ames Avenue would narrow the street to only one lane, and would delay traffic, some of which would likely divert to other streets such as Yosemite Drive. Ames Avenue carries 238 AM peak hour trips and 278 PM peak hour trips, so traffic diverted to Yosemite Drive would still be well within the carrying capacity of Yosemite Avenue (Kittelson 2012), and volumes on Yosemite Avenue would still meet the City of Milpitas basic traffic LOS goal. Impacts to LOS would be less than significant.

The UPRR trestle would be replaced with a double barrel concrete box culvert. The culvert would be a precast structure, and would be placed over the course of three days, during which time the UPRR rail line would be closed. Because rail traffic can be rerouted or rescheduled during this short timeframe, the impact on rail traffic would be less than significant.

CONSTRUCTION (REACH 4). The southernmost staging site is in Reach 4, at the southwest corner of the Montague Expressway and I-680. This site would be accessed from the Montague Expressway, which is a designated truck route. Trucks would enter and exit access roads along the channel at the Montague Expressway Bridge, which is found where Montague Expressway crosses Upper Berryessa Creek. Truck traffic would haul materials to and from the staging areas and access roads, leading to possible delays to traffic when trucks enter or exit Montague Expressway. A total of 15,500 cubic yards of material would be excavated in Reach 4. If all of the material were hauled off-site and disposed of, approximately four daily round trip truck trips (eight total trips) would occur. An additional three to four round-trip truck trips (six to eight total trips) for importing materials or equipment would occur per day. Assuming 10-hour work days, an average of 1.5 truck trips per hour would occur on Montague Expressway, representing less than 1/10 of 1 percent of peak hour traffic volumes. Due to the low numbers of trucks entering the roadway per hour, LOS on roadways and at intersections is not likely to be affected. Delays to allow trucks to enter or exit the work area, or due to the presence of slow-moving truck traffic, would occur up to 15 times daily. As discussed under Reaches 1–3, the primary impact from construction truck traffic would be a temporary and intermittent reduction of roadway capacities due to the slower movements of trucks compared to passenger vehicles. Drivers could experience delays if they were traveling behind a construction truck. Impedance to traffic flow during the weekday peak traffic hours would be a short-term significant impact.

OPERATIONS (ALL REACHES). Although some additional maintenance trips would be required to inspect and maintain floodwalls, extended access roads, and other features, the overall level of maintenance would be reduced due to a better channel design that moves sediment through the system more efficiently. Therefore, less excavation would be required, reducing truck trips for off-site disposal, thereby reducing traffic volumes. Impacts from operations and maintenance would be less than significant.

MITIGATION. Transportation management plans and/or traffic control plans would be prepared and implemented during construction to meet Caltrans and local agency needs. These plans are described as Mitigation Measure TRA-A, discussed in Section 3.15.6 below.

SIGNIFICANCE AFTER MITIGATION. Traffic delay impacts would be less than significant after implementation of Mitigation Measure TRA-A. Implementation of these mitigation measures would reduce transportation impacts to a less than significant level during construction by scheduling truck trips outside of peak morning and evening commute hours as needed to avoid adverse impacts on traffic flow, ensuring that flaggers are on-site to direct traffic and minimize delays, minimizing disruption to local bus routes by coordinating with all local traffic agencies, VTA, and AC Transit prior to construction, identifying haul routes and detour routes, and establishing adequate measures to reduce traffic hazards. The plans would also be prepared in coordination with emergency service providers including fire and police departments, ambulance companies, and other responders to ensure that: (1) flaggers prioritize access for emergency vehicles; (2) service providers are notified of planned construction actions that may delay traffic; (3) emergency service providers are consulted when designing haul routes or other project features that could affect emergency access; and (4) alternate forms of transit are accounted for during construction and operations.

TRA-2 CONFLICT WITH AN APPLICABLE CONGESTION MANAGEMENT PROGRAM, INCLUDING BUT NOT LIMITED TO, LEVEL OF SERVICE STANDARDS AND TRAVEL DEMAND MEASURES, OR OTHER STANDARDS ESTABLISHED BY THE COUNTY CONGESTION MANAGEMENT AGENCY FOR DESIGNATED ROADS OR HIGHWAYS

Less than significant for construction; less than significant for operations

CONSTRUCTION (REACHES 1–3). Up to 40 workers would access the construction zone on a daily basis. Most workers would likely enter the construction zone before 7 a.m. and leave between 4 and 5 p.m., resulting in minor traffic increases at these times. Construction trucks would access the staging and construction areas off of adjacent streets. Up to 50 truck trips per day (approximately five per hour) are expected during construction in these reaches, spread between multiple ingress/egress points. While the presence of these vehicles would add a small increment to area traffic, the increases are within the carrying capacity of Calaveras Boulevard, Los Coches Street, Ames Avenue, and Yosemite Drive; therefore, impacts on traffic load and road capacity would be less than significant (Kittelson 2012). In particular, construction traffic or construction-related traffic delays would not reduce LOS below the LOS standard for roadways and intersections within the Santa Clara County CMP network. This impact would be less than significant.

CONSTRUCTION (REACH 4). There would be no substantive changes in traffic volumes during construction in this reach. Worker vehicles would access the staging area off of Montague Expressway, but most workers would reach the site before the morning peak commute, so would avoid affecting traffic in the morning. Assuming that workers leave the construction area during the evening peak commute, the number of workers leaving from construction areas in Reach 4 would be less than 40, a total that is well within the carrying capacity of Montague Expressway and surrounding streets. Additionally, an average of 15 truck trips per day would be needed to haul materials to and from the site, but this amount of traffic is also within the carrying capacity of Montague Expressway and surrounding streets, and would not affect Santa Clara County's CMP standard. This impact would be less than significant.

OPERATIONS AND MAINTENANCE (ALL REACHES). During operations, overall traffic is expected to decrease due to the lower need to excavate sediment and repair eroded banks. Therefore, impacts related to the County CMP from operations and maintenance would be less than significant.

MITIGATION (NOT REQUIRED). Although not required to mitigate project impacts to congestion management plans, Mitigation Measure TRA-A, discussed in Section 3.15.6 below, would further reduce the project's less than significant impacts on congestion management

SIGNIFICANCE AFTER MITIGATION. Impacts would remain less than significant after implementation of Mitigation Measure TRA-A.

TRA-3. RESULT IN CHANGE IN AIR TRAFFIC PATTERNS INCLUDING EITHER AN INCREASE IN TRAFFIC LEVELS OR A CHANGE IN LOCATION THAT RESULTS IN SUBSTANTIAL SAFETY RISKS

No impact for construction; no impacts for operations

The nearest airport is the San Jose International Airport, which is located approximately 4 miles southwest of the project area. There are no private airstrips within the vicinity of the project. According to the Santa Clara County Land Use Plan for the Norman Y. Mineta San Jose International Airport (2011), the project area is not within or near any of the safety zones associated with the airport nor within the airport influence area. Given the project's distance from an airport, and that the project would not involve the installation of structures that could interfere with air space, there would be no impacts to air traffic patterns or safety risks associated with airport operations.

TRA-4. SUBSTANTIALLY INCREASE HAZARDS DUE TO A DESIGN FEATURE

Less than significant with mitigation for construction; less than significant for operations

CONSTRUCTION (REACHES 1–3). Trucks hauling materials to and from the project area would share the local and regional roadways with other vehicles. These large and generally slower-moving vehicles could result in safety hazards, especially near residences and schools. The excavation and other activities in the work zone could also create safety hazards for pedestrians and bicyclists if the construction area is not appropriately fenced off from adjacent properties and roadways/sidewalks. Access to sidewalks at Calaveras Boulevard and Los Coches Street may be affected when trucks are entering Calaveras Boulevard, Yosemite Drive, or Ames Avenue from the access road or entering the access road from Los Coches Street or Ames Avenue. In general, these effects would be temporary; however, lengthier delays may occur at some points when particularly large vehicles or equipment may need to enter or exit at these locations. During partial road and sidewalk closures, pedestrians may need to cross the street to access the nearest sidewalk, creating a hazard to pedestrians. Increased hazard may also result from wear and tear on surface streets caused by heavy construction vehicles, causing dangerous conditions for bicyclists and motorcyclists. These effects would be significant.

Construction vehicles on the access roads would cross active railroad tracks that are not equipped with warning devices, creating a significant impact by exposing truck and train operators to a potentially harmful situation. This impact would be significant.

CONSTRUCTION (REACH 4). Impacts would generally be the same as in Reaches 1–3. Delays in crossing sidewalks over the Montague Expressway Bridge may be lengthy and require pedestrians to walk several blocks to find suitable crosswalks, or risk an illegal crossing. Creation of potholes and other signs of wear

and tear on surface streets may occur on surface streets, creating a potential hazard to bicyclists and motorcyclists. These impacts would be significant.

OPERATIONS AND MAINTENANCE (ALL REACHES). Operations and maintenance needs would be reduced relative to current conditions. Impacts associated with public safety hazards would be less than significant.

MITIGATION. Transportation management plans and/or traffic control plans would be prepared and implemented during construction to meet Caltrans and local agency needs. These plans are described as Mitigation Measure TRA-A, discussed in Section 3.15.6 below. The plans would contain measures to ensure safe passage at crosswalks and sidewalks and measures to ensure that safety hazards are addressed prior to and during construction. All vehicles would be required to comply with standards for vehicular safety, including showing adequate maintenance and workability of safety features including brakes, horns, flashers, back-up beepers, and mirrors, and would be required to comply with all speed regulations.

SIGNIFICANCE AFTER MITIGATION. The transportation management plans and traffic control plans under Mitigation Measure TRA-A would contain measures to ensure safe passage at crosswalks and sidewalks and measures to ensure that safety hazards are addressed prior to and during construction. All vehicles would be required to comply with standards for vehicular safety, including showing adequate maintenance and workability of safety features including brakes, horns, flashers, back-up beepers, and mirrors, and would be required to comply with all speed regulations. These measures would ensure that increases in safety hazards would not be substantial. Implementation of Mitigation Measure TRA-A would ensure that impacts are less than significant.

TRA-5 RESULT IN INADEQUATE EMERGENCY ACCESS

Less than significant with mitigation for construction; less than significant for operations

CONSTRUCTION (REACHES 1-3). Construction would primarily occur within the established construction areas, including the existing access roads and the District's right-of-way. During design, the District would obtain easements from UPRR, the City of Milpitas, and private landowners, and would comply with all components of these easements. Due to trucks entering or exiting the access roads, temporary lane closures on Los Coches Street, Ames Avenue, and Yosemite Drive would have the potential to affect emergency access, resulting in a significant impact.

CONSTRUCTION (REACH 4). Construction in Reach 4 would primarily occur within the established construction areas, including the existing access roads and the District's right-of-way. During design, the District would obtain easements from the City of Milpitas and private landowners, and would comply with all components of these easements. Lane closures on Montague Expressway are not planned so trucks entering and exiting this multi-lane road would not impede emergency vehicles. This impact would be less than significant.

OPERATIONS (ALL REACHES). No aspect of operations would affect emergency access, and access to the project area would be enhanced due to culvert overcrossings at Los Coches Creek and Piedmont Creek, as well as by the new access road that would start at Los Coches Street and connect with the existing access road approximately 600 feet south. Therefore, impacts from operations would be less than significant.

MITIGATION. As described in Mitigation Measure TRA-A, transportation management plans and/or traffic control plans would be implemented during construction. These plans are described as Mitigation Measure TRA-A, discussed in Section 3.15.6 below. These plans would be prepared in coordination with the agencies mentioned above which may administer local or regional plans to manage traffic congestion, transit, non-motorized transit, traffic safety, emergency response, air quality, and other concerns. Also, Mitigation Measure HWM-B includes an emergency evacuation plan, which will detail measures to further facilitate emergency response.

SIGNIFICANCE AFTER MITIGATION. Implementing Mitigation Measures TRA-A and HWM-B would reduce impacts to emergency access to less than significant by ensuring adequate emergency access is maintained in the project vicinity during the construction period.

TRA-6 CONFLICT WITH ADOPTED POLICIES, PLANS, OR PROGRAMS REGARDING PUBLIC TRANSIT, BICYCLE, OR PEDESTRIAN FACILITIES, OR OTHERWISE DECREASE THE PERFORMANCE OR SAFETY OF SUCH FACILITIES

Less than significant with mitigation for construction; less than significant with mitigation for operations

CONSTRUCTION (REACHES 1–3). Transit service may be affected if traffic delays occur as a result of trucks entering or exiting the access roads or staging areas. Minor delays to buses may occur when trucks are entering or leaving Calaveras Boulevard, which may occur on average up to five times per hour. This impact is less than significant because the performance of transit systems would not be decreased.

Temporary lane closures on Los Coches Street and Yosemite Avenue for a period of up to 10 days would have a short-term impact on bicyclists, although the streets would remain open and no detours to other streets would be required. Sidewalks on one side of Los Coches Street, Yosemite Avenue, and Ames Avenue may also be closed for up to 10 days, although sidewalks on the other side of the street would remain open or other pedestrian routes provided that would not require detours to other streets. Entering and exiting construction vehicles would cross the bike route and sidewalks at these streets, potentially endangering pedestrians and bicyclists. Therefore, this impact would be significant because construction of the proposed project would increase safety hazards for pedestrian and bicycle facilities.

CONSTRUCTION (REACH 4). Transit service would not be substantially affected by the project since the work is not primarily occurring on or immediately adjacent to area roadways. The four transit routes using Montague Expressway would only be affected during construction in this reach by minor delays occurring when trucks enter or exit the work area, or by slow-moving construction vehicles. These delays would likely be less than 30 seconds and less than significant because the performance of transit systems would not be decreased.

No sidewalk or bike route closures are proposed for Montague Expressway. Entering and exiting construction vehicles would cross the bike route and sidewalk, potentially endangering pedestrians and bicyclists, which would be a significant impact because construction of the proposed project would increase safety hazards for pedestrian and bicycle facilities.

OPERATIONS (ALL REACHES). Although some additional maintenance would be required to inspect and maintain floodwalls, extended access roads, and other features, the overall level of maintenance would be reduced due to a better channel design that moves sediment through the system more efficiently.

Therefore, less excavation would be required, reducing truck trips for off-site disposal, thereby reducing traffic volumes and causing reduced impacts to transit vehicles.

MITIGATION. Under Mitigation Measure TRA-A, transportation management plans and/or traffic control plans would be prepared and implemented during construction to meet Caltrans and local agency needs. These plans are described as Mitigation Measure TRA-A, discussed in Section 3.15.6 below.

SIGNIFICANCE AFTER MITIGATION. Impacts to pedestrian and bicycle facilities would be less than significant after implementation of Mitigation Measure TRA-A. The transportation management plans and traffic control plans called for by this measure would ensure safe passage at crosswalks and sidewalks, and ensure that safety hazards to pedestrians and bicyclists are addressed prior to and during construction.

3.15.6. Mitigation Measures

TRA-A. PREPARE AND IMPLEMENT A TRANSPORTATION MANAGEMENT PLAN AND TRAFFIC CONTROL PLAN. The District will work with the USACE to implement the following mitigation measure. As required by Caltrans to mitigate impacts to SR-237 (Calaveras Boulevard), the construction contractor will develop a Transportation Management Plan in accordance with the Caltrans' Manual of Uniform Traffic Control Devices. The plan will conform to professional traffic engineering standards and will prescribe methods for maintaining traffic flows on roadways directly affected by construction. The plan will be submitted to Caltrans for approval before the start of construction. Mitigation measures, such as use of flaggers and timing of deliveries, will be incorporated into the construction plans in order to reduce effects to traffic.

The construction contractor will also be required to develop a Traffic Control Plan prior to construction, and coordinate all use of public roads with the Cities of Milpitas and or San Jose, local and regional planning agencies, emergency service providers, air quality management districts, or other responsible agencies. This plan will include the following measures:

- Construction vehicles will not be permitted to block any roadways or driveways.
- Truck trips will be scheduled outside of peak morning and evening commute hours, as well as during peak school circulation times, to the extent possible.
- Signs and flagmen will be used, as needed, to alert motorists, bicyclists, and pedestrians to the presence of haul trucks and construction vehicles at all access points.
- Vehicles will be required to obey all speed limits, traffic laws, and transportation regulations during construction. Vehicles will not exceed 15 miles per hour on unpaved roads.
- Construction workers will be encouraged to carpool and park in designated staging areas.
- Closure of roads, staging areas, and construction sites will be clearly fenced and delineated with appropriate closure signage.
- Any roads damaged by construction will be repaired.
- Circulation plans will be developed to minimize impacts on local street circulation. Flaggers and/or signage will be used to guide vehicles through and/or around the construction zone.
- The construction contractor will notify all emergency service providers in advance of construction to inform them of the construction activities. Traffic control staff will be trained in specific methods to prioritize and ensure access for emergency vehicles. Access will be provided for emergency vehicles at all times.

- Truck routes will be identified in the Traffic Control Plan. Haul routes will utilize City of Milpitas, City of San Jose, and Caltrans designated haul routes and minimize truck traffic on local roadways and residential streets to the extent possible.
- Sufficient staging areas will be provided for trucks accessing construction zones to minimize disruption of access to adjacent land uses.
- Access to driveways and private roads will be maintained. If access must be restricted for brief periods, property owners shall be notified in advance.
- The construction contractor will coordinate with UPRR for work within the right-of-way and avoid disruption to the rail corridor.
- Construction will be coordinated with local traffic agencies, VTA, and AC Transit to minimize disruption to service on local bus routes.
- Construction will coordinated with police and fire stations, transit stations, hospitals, and schools. Facility operators shall be notified in advance of the timing, location, and duration of construction activities.
- Pedestrian and bicycle access and circulation will be maintained during construction where safe to do so. If construction activities encroach on a bicycle lane, warning signs will be posted.
- Work site(s) will be appropriately fenced off from adjacent properties, roadways, and sidewalks to ensure safety of nearby residents and pedestrians.
- All construction equipment and materials will be stored in designated contractor staging areas on or adjacent to the worksite, in such a manner as to minimize obstruction of traffic.

3.15.7. **Statement of Impact**

Table 3.39 summarizes the significance of construction and operations impacts to traffic and transportation. Significant impacts associated with consistency with circulation and congestion management plans; hazardous design features; emergency access; transit and alternative transportation plans would occur, but would be reduced to less than significant with implementation of mitigation measures identified in Section 3.15.6.

Table 3.39 Statement of Impacts, Traffic and Transportation			
Impact	**Prior to Mitigation**	**Proposed Mitigation**	**After Mitigation**
TRA-1. Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to streets, highways and freeways, pedestrian and bicycle paths, and mass transit.	S	TRA-A	LM
TRA-2. Conflict with an applicable congestion management program, including but not limited to, level of service standards and travel demand measures, or other standards established by the County congestion management agency for designated roads or highways.	LS	TRA-A	LS
TRA-3. Result in change in air traffic patterns including either an increase in traffic levels or a change in location that results in substantial safety risks.	NI	None	NI
TRA-4. Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or construction traffic.	S	TRA-A	LM
TRA-5. Result in inadequate emergency access	S	TRA-A HWM-B	LM
TRA-6. Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.	S	TRA-A	LM
NI–No Impact, LS–Less than Significant, LM–Less than Significant with Mitigation, S–Significant, SU–Significant and Unavoidable			

3.16. UTILITIES AND SERVICE SYSTEMS

This section analyzes potential impacts on utilities and service systems in the vicinity of the proposed project. Utilities and service systems discussed in this section include natural gas, electricity, stormwater drainage, water supply distribution systems, wastewater collection and treatment systems, and solid waste disposal. This section also identifies mitigation measures that would reduce significant impacts to a less than significant level.

3.16.1. Environmental Setting

Utilities and service systems in the project area are typical of those normally found in a highly urbanized setting. The stream channel is underlain by underground gas and water lines, and overhead power lines run perpendicular and parallel to the stream channel. Stormwater outfalls are found in several locations along Upper Berryessa Creek, and the creek itself functions to move stormwater out of the immediate area.

3.16.2. Existing Conditions

Various public and private utilities serve the areas adjacent to Upper Berryessa Creek and may be subject to temporary or permanent relocations as a result of constructing the proposed project.

ELECTRICITY. Electrical service in San Jose and Milpitas is provided by Pacific Gas and Electric (PG&E). Overhead and underground power lines are located adjacent to or cross over the creek at a number of locations.

NATURAL GAS. PG&E provides natural gas services in San Jose and Milpitas. One gas line has been identified in the project area, and crosses the creek beneath the Montague Expressway Bridge.

SANITARY SEWER. The sanitary sewer systems are owned and operated by the Cities of San Jose and Milpitas. There are two components to the sewer system. The first component includes the sewer mains and pipes that collect effluent and transport it to the San Jose/Santa Clara Regional Wastewater Facility (co-owned by the Cities of San Jose and Santa Clara). The second is a series of mains and pipes that transport some of the treated wastewater for non-potable uses such as irrigation and dust suppression. A sanitary sewer line is found just east of and parallel to the creek in Reaches 1 and 2, within the project area.

SOLID WASTE. The collection, transport, and disposal of solid waste and recyclables within Milpitas are handled by Allied Waste Services under contract to the City. In the section of San Jose adjacent to the proposed project, Garden City Sanitation has the garbage collection contract, while California Waste Solutions handles recycling and Green Waste Recovery deals with yard trimmings.

Construction waste from the proposed project could be received by active landfills in either Santa Clara County or Alameda County. The facilities include: Guadalupe Sanitary Landfill, Kirby Canyon Recycling and Disposal Facility, Newby Island Landfill, Zanker Material Processing Facility, Zanker Road Resources Recovery Operations Landfill, Altamont Landfill and Resource Recovery, and Vasco Road Sanitary Landfill. Annual throughput at all of these facilities is below their annual total capacity. Of these facilities, Newby Island, Altamont, and Vasco Road accept contaminated soil (Cal Recycle 2015).

STORMWATER. The storm drain systems are owned and maintained by the Cities of San Jose and Milpitas. Fourteen stormwater outfalls have been mapped within the project area and are shown in Figures 3.20 and 3.21.

In Milpitas, the City owns and operates the majority of the stormwater drainage system that serves the project area. These facilities are maintained by the City's Engineering Department. The City's Storm Drain Master Plan, updated in 2013, states that stormwater runoff in Milpitas is collected in a system of underground pipes and a network of street gutters. Local runoff flows into creeks and channels that run through the City, ultimately discharging to San Francisco Bay.

In San Jose, all stormwater flows down the gutter, into the storm drain, and out to the nearest creek without treatment. Pollutants such as oil, soap, dirt, trash, dirty wash water, grease, and more can pollute the environment and may harm wildlife and water quality. The City's Stormwater NPDES requires that the City protects the storm drains, creeks, and the Bay from polluted discharges originating from industrial and commercial facilities. The Industrial/Commercial Facility stormwater inspection program serves the City of San Jose.

TELECOMMUNICATIONS. AT&T provides local telephone service within the Cities of Milpitas and San Jose, while Comcast Cable Communications provides cable television services. Verizon Wireless has cell towers and lines in the area. Phone lines are mapped crossing the project area at Yosemite Drive, Calaveras Boulevard, and in other parts of Reach 1 (Figure 3.20). Cable lines have been mapped crossing

the project area at Los Coches Street and parallel to the creek just downstream of I-680 in Reach 4 (Figure 3.21).

WATER SUPPLY – POTABLE. The City of Milpitas receives water from the District and the San Francisco Public Utilities Commission, with nearly two-thirds purchased from the District. The San Jose Water Company provides water in the portion of the City of San Jose adjacent to the project area, with approximately half of the supply purchased from the Santa Clara Valley Water District. Water lines are mapped crossing the project area in two locations just downstream of I-680 in Reach 4, at Ames Avenue in Reach 3, and at Calaveras Boulevard in Reach 1.

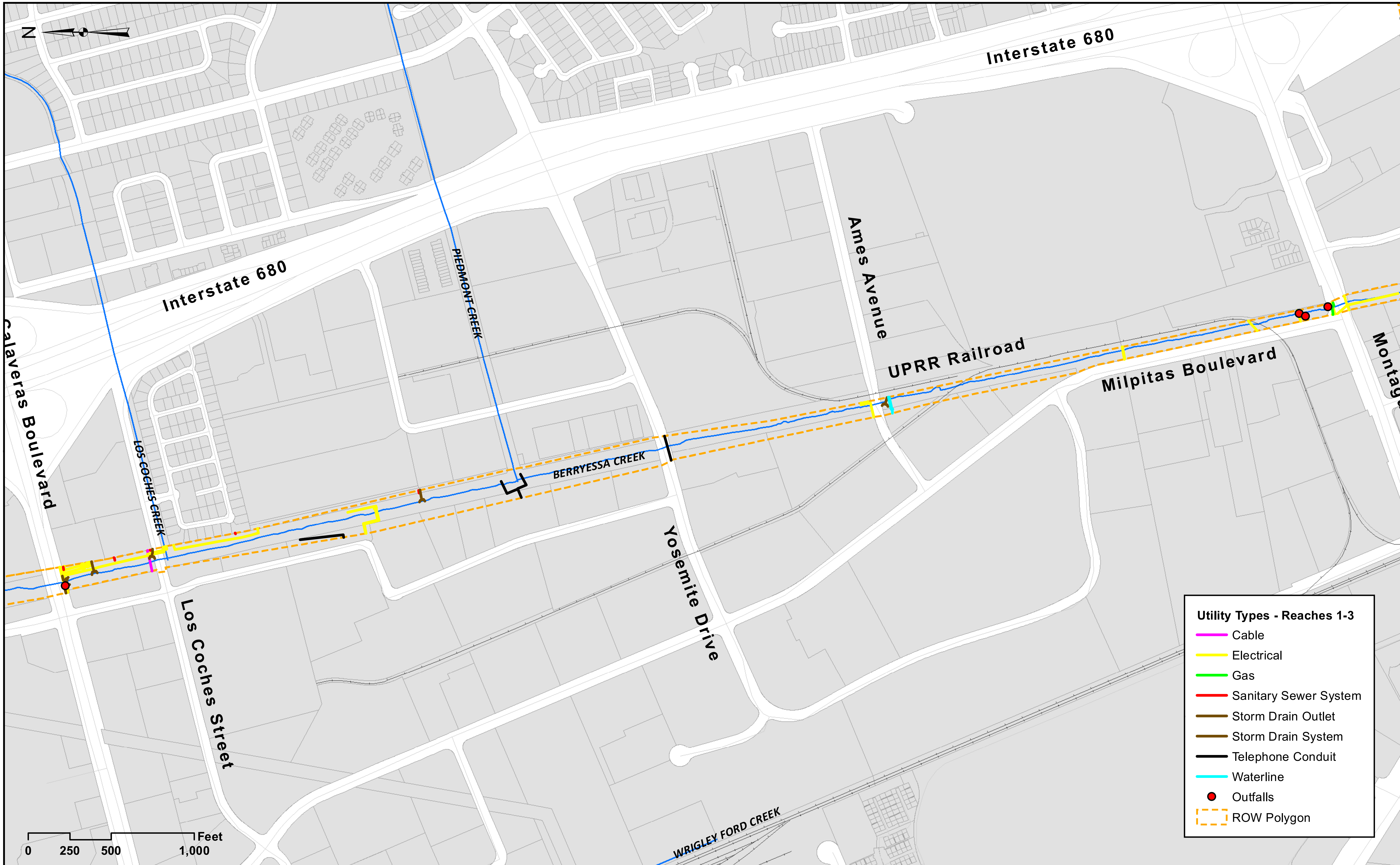

Figure 3.20 Utilities - Montague Expwy to Calaveras Blvd

Tetra Tech
17885 Von Karman Avenue, Suite 500
Irvine, CA 92614
Tel. (949) 809-5000 Fax. (949) 809-5003

Santa Clara Valley Water District

UPPER BERRYESSA CREEK
FLOOD RISK MANAGEMENT PROJECT

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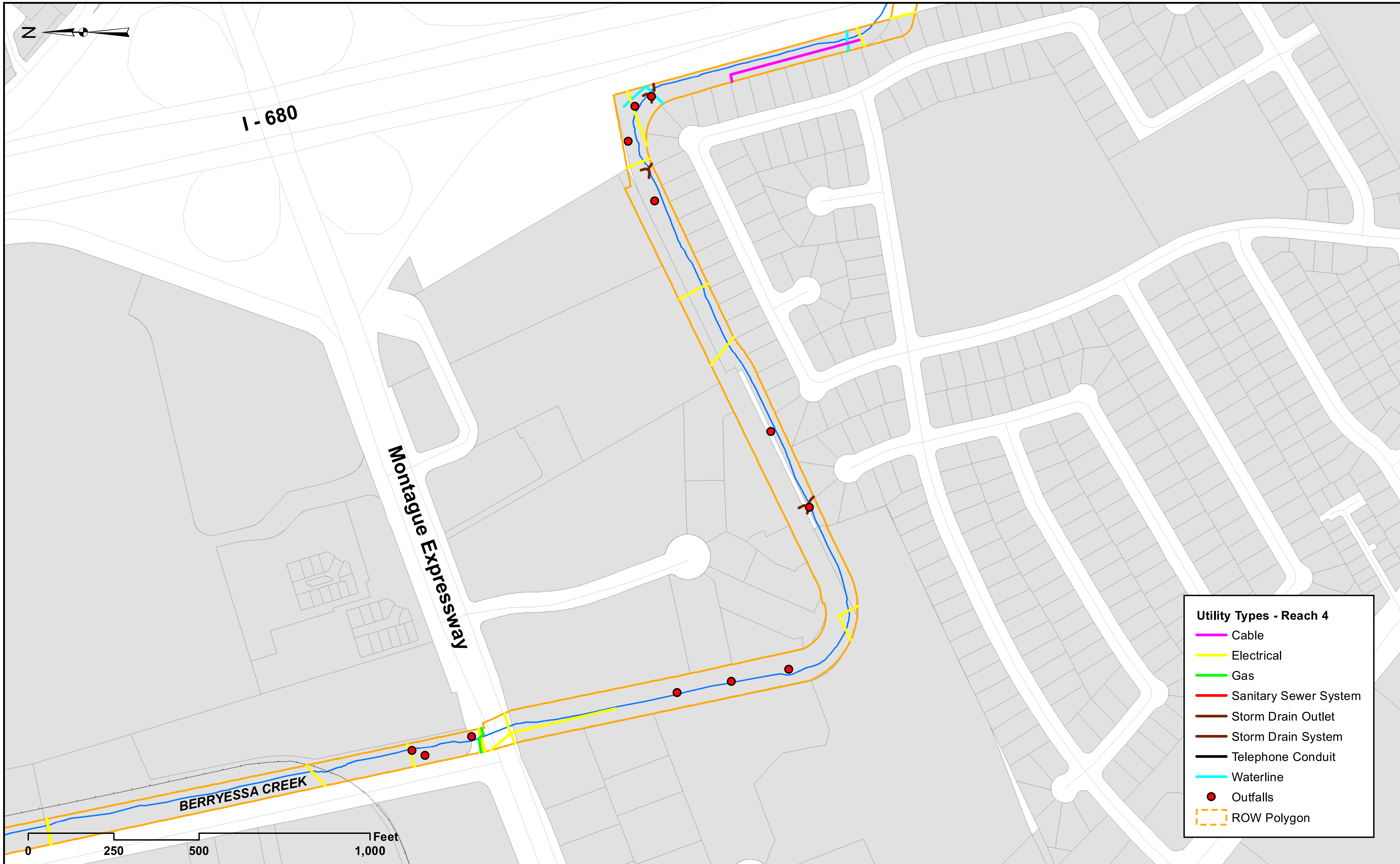

Figure 3.21 Utilities - I-680 to Montague Expwy

Tetra Tech
17885 Von Karman Avenue, Suite 500
Irvine, CA 92614
Tel. (949) 809-5000 Fax. (949) 809-5003

Santa Clara Valley Water District

UPPER BERRYESSA CREEK
FLOOD RISK MANAGEMENT PROJECT

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WATER SUPPLY – RECYCLED. Both cities purchase recycled water from the South Bay Water Recycling Program for irrigation, industrial, and other purposes.

3.16.3. Regulatory Setting

3.16.3.1. *State Regulations*

CALIFORNIA INTEGRATED WASTE MANAGEMENT ACT OF 1989. The California Integrated Waste Management Act of 1989 (PRC, Division 30), enacted through Assembly Bill 939 and modified by subsequent legislation, requires all California cities and counties to implement programs to reduce, recycle, and compost at least 50 percent of wastes by the year 2000, and to divert at least 75 percent by 2010 (PRC §41780). The State determines compliance with this mandate to divert 50 percent of generated waste (which includes both disposed and diverted waste) through a complex formula. This formula requires cities and counties to conduct empirical studies to establish a "base year" waste generation rate against which future diversion is measured. The actual determination of the diversion rate in subsequent years is arrived at through deduction, not direct measurement; rather than counting the amount of material recycled and composted, the City or County tracks the amount of material disposed of at landfills, and then subtracts the disposed amount from the base-year amount (PRC §41780.2). As of 2006, the most recent year for which jurisdiction summary information is available, Milpitas' diversion rate was 60 percent; this rate is consistent with AB 939. The diversion rate for commercial solid wastes in the City of San Jose as of 2013 is 70 percent (City of San Jose 2013b).

TITLE 8, SECTION 1541 OF THE CALIFORNIA CODE OF REGULATIONS. This requires excavators to determine the approximate locations of subsurface installations such as sewer, telephone, fuel, electric, and water lines (or any other subsurface installations that may reasonably be encountered during excavation work) prior to excavation.

CALIFORNIA GOVERNMENT CODE §4216 ET SEQ. This law requires owners and operators of underground utilities to become members of and participate in a regional notification center, such as Underground Service Alert Northern California (USA North). USA North receives planned excavation reports from public and private excavators, and transmits that information to all participating members who may have underground facilities at the location of excavation. The USA North members mark or stake their facility, provide information, or give clearance to dig.

3.16.3.2. *Local Plans and Policies*

CITY OF MILPITAS SEWER MASTER PLAN*.* The 2009 Sewer Master Plan Update defines the sewer collection system improvements necessary to accommodate the City's future land use development plans to build-out, including assorted General Plan Amendments and the Milpitas Transit Area. The objectives of the 2009 Sewer Master Plan Update are to update land uses under three development scenarios; identify pipe and pumping deficiencies that may result from increased development; and recommend projects to relieve these deficiencies (RMC 2009a).

CITY OF MILPITAS WATER MASTER PLAN*.* This 2009 Water Master Plan Update is an update to the City's 2002 Water Master Plan, which defines the water system improvements necessary to meet the City's 2002 water demand and future demand associated with future development plans for 2008, 2018, and build-out year of 2021. The 2009 Water Master Plan Update is a reevaluation of the City's water system capacity based on updated land use information from several near- and long-term development

projects currently in the planning process. The objectives of this planning document are to update the land use information for three potential development scenarios; identify transmission and storage deficiencies caused by this change in water demand; and recommend projects to relieve these deficiencies. Each water supply area (i.e., San Francisco Public Utility District and the District supply zones) was evaluated independently (City of Milpitas 2009).

CITY OF MILPITAS GENERAL PLAN*.* The following policies from the City of Milpitas General Plan address utilities and waste management:

- 2.d-I-1. Coordinate capital improvement planning for all municipal service infrastructure with the location and timing of growth.
- 2.d-I-2. Periodically update the City's water and sewer master plans.
- 4.d-G-1. Assure reasonable protection of beneficial uses of creeks and South San Francisco Bay, and protect environmentally sensitive areas.
- 4.d-G-2. Comply with regulatory requirements pertaining to water quality.
- 4.d-G-3. Continuously improve implementation of stormwater pollution-prevention activities.
- 4.d-G-4. Mitigate the effects that land development can have on water quality.
- 4.d-G-5. Protect and enhance the quality of water resources in the planning area.
- 4.d-G-6. Promote conservation and efficiency in the use of water.
- 4.d-P-3. Work cooperatively with other cities, towns, and the District to comply with regulations, reduce pollutants in runoff, and protect and enhance water resources in the Santa Clara Basin.
- 4.d-P-12. Construction sites shall incorporate measures to control erosion, sedimentation, and the generation of runoff pollutants to the maximum extent practicable. The design, scope and location of grading and related activities shall be designed to cause minimum disturbance to terrain and natural features. (Title II, Chapter 13 of the Municipal Code includes requirements for control of erosion and sedimentation during grading and construction.)
- 4.d-A-7. Support and participate in the Santa Clara Valley Urban Runoff Pollution Prevention Program. Through this program, support regional organizations and efforts, including the Bay Area Stormwater Management Agencies Association, to monitor and protect water quality in San Francisco Bay and its tributaries.
- 4.d-A-8. Coordinate with the District to plan and implement multi-objective projects to reduce flood hazards, restore stream functions, and provide recreational resources along Berryessa Creek and other Milpitas creeks.
- 4.h-I-1. Implement measures specified in the City's Source Reduction and Recycling Element and the City's Household Hazardous Waste Element.

CITY OF SAN JOSE STORMWATER MANAGEMENT ANNUAL REPORT*.* San Jose issues an annual report (latest issued in September 2014 covering 2013-2014) concerning compliance with its NPDES permit in six areas:

- Ensuring City operations integrate water quality protection;
- Preventing pollutant discharges through effective enforcement;
- Guiding Development to Protect the Watershed;
- Developing and Implementing Strategies to Reduce Target Pollutants;
- Motivating Public Stewardship of the Watershed; and
- Collecting High Quality Monitoring Data.

The City emphasizes appropriate BMPs to control and reduce non-stormwater and polluted stormwater discharges to storm drains and waterways during operation, inspection, and routine repair, as well as maintenance of municipal facilities and infrastructure.

ENVISION SAN JOSE 2040 GENERAL PLAN. San Jose's General Plan includes specific policies addressing energy conservation, water conservation, waste diversion and waste reduction. Among the pertinent policies are:

- MS-2.4 - Promote energy efficient construction industry practices.
- MS-5.5 - Maximize recycling and composting from all residents, businesses, and institutions in the City.
- MS-5.8 - Revise landscaping specifications to align with State-recommended guidelines that incorporate Integrated Pest Management and to support use of mulch and compost.
- MS-6.5 - Reduce the amount of waste disposed in landfills through waste prevention, reuse, and recycling of materials at venues, facilities, and special events.

3.16.4. Significance Criteria

The proposed project would have significant impacts on utilities and service systems if the project would:

UTL-1 Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board;

UTL-2 Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects;

UTL-3 Require or result in the construction of new stormwater drainage facilities, or expansion of existing facilities, the construction of which could cause significant environmental effects;

UTL-4 Have insufficient water supplies available to serve the project from existing entitlements and resources, or if new or expanded entitlements are required;

UTL-5 Result in a determination by the wastewater treatment provider which serves or may serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments;

UTL-6 Be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs; or

UTL-7 Fail to comply with Federal, State, and local statutes and regulations related to solid waste.

3.16.5. Potential Impacts

3.16.5.1. *Significance Criteria with No Impacts*

The following significance criteria are not discussed further in the EIR because the proposed project would not result in impacts related to this criterion:

UTL-3 **Require or result in the construction of new stormwater drainage facilities, or expansion of existing facilities, the construction of which could cause significant environmental effects.** Temporary stormwater management features would be implemented around staging and construction areas according to the SWPPP, which would be developed by the construction contractor. These features would include silt containment fences, straw bales, berms, or swales designed to prevent erosion during precipitation and consequent siltation

of stormwater. These features would be temporary. Permanent stormwater features such as outfalls that would be affected during construction would be replaced in-kind, and no new stormwater features are proposed or needed. The proposed project would not alter stormwater drainage patterns other than to enhance stormwater conveyance downstream.

3.16.5.2. *Significance Criteria with Potential Impacts*

UTL-1 EXCEED WASTEWATER TREATMENT REQUIREMENTS OF THE APPLICABLE REGIONAL WATER QUALITY CONTROL BOARD

Less than significant with mitigation for construction; no impacts for operations

CONSTRUCTION (REACHES 1–3). Wastewater may be generated during construction from two sources. The first source is through temporary and portable sanitary facilities that would be placed on-site to service construction crews. The volume of wastewater generated by temporary sanitary facilities would be minor, and disposal of this wastewater would be handled by a licensed disposal contractor who would operate in compliance with all regulations and permit conditions. Such wastes would be disposed of at approved wastewater facilities and volumes are not expected to be significant in comparison to the capacity of these facilities.

The second potential source of wastewater would be if groundwater from contaminated plumes identified in Reach 3 near the Jones Chemical site (see Section 3.9.2) were encountered during project excavation. Although extensive remediation efforts have reduced the level of contamination at these sites, it is assumed that VOC concentrations are still above levels that would meet RWQCB requirements for downstream discharge. Based on current design plans and studies showing depth to groundwater (Section 3.9.2), it is likely that groundwater would be encountered during construction, in which case it would need to be treated on site for eventual discharge to the creek (Tetra Tech 2015h). Downstream discharge of groundwater or other wastewater with pollutant levels higher than allowable thresholds established by the SFBRWQCB would be a significant impact.

CONSTRUCTION (REACH 4). Contaminated groundwater has not been identified in Reach 4; therefore, discharges to downstream areas would not violate regulations concerning discharge of contaminated groundwater. All other requirements set forth by the SFBRWCB for downstream discharge of water during dewatering to allow project construction, including testing for contaminants and ensuring that turbidity remains within allowable limits, would be met prior to discharge. Therefore, impacts in Reach 4 would be less than significant.

OPERATIONS (ALL REACHES). No aspect of operations and maintenance would generate wastewater other than minor incidental runoff that may occur during irrigation used to establish plant communities in the first 2 years after construction. Such discharge would be minimal and water used for irrigation would come from a clean source. Impacts to water quality from irrigation water runoff would be less than significant during operations.

MITIGATION. If contaminated groundwater is encountered at the JCI off-site area during construction, the District will work with USACE to ensure implementation of Mitigation Measure HWM-C.

SIGNIFICANCE AFTER MITIGATION. Implementation of Mitigation Measure HWM-C would ensure that groundwater encountered during construction meets RWQCB water quality standards prior to discharge. Therefore, impacts after mitigation would be less than significant.

UTL-2 REQUIRE OR RESULT IN THE CONSTRUCTION OF NEW WATER OR WASTEWATER TREATMENT FACILITIES OR EXPANSION OF EXISTING FACILITIES, THE CONSTRUCTION OF WHICH COULD CAUSE SIGNIFICANT ENVIRONMENTAL EFFECTS.

Less than significant for construction; Less than significant for operations

AND,

UTL-5 RESULT IN A DETERMINATION BY THE WASTEWATER TREATMENT PROVIDER THAT WOULD SERVE THE PROJECT THAT IT HAS INADEQUATE CAPACITY TO SERVE THE PROJECT'S PROJECTED DEMAND IN ADDITION TO THE PROVIDER'S EXISTING COMMITMENTS

Less than significant for construction; no impacts for operations

CONSTRUCTION AND OPERATION (ALL REACHES). As discussed above, construction of the proposed project would result in generation of only small amount of wastewater that would need to be treated by a wastewater treatment facility. In addition, there are sufficient water supplies available to serve the construction and operation of the project (see discussion on Impact UTL-4 below). Therefore, the project would not require or result in construction of new water or wastewater treatment facilities or expansion of existing facilities. The project would also not result in determination by the wastewater treatment provider that would serve the project that it has inadequate capacity to serve the project's projected demand. The impact would be less than significant.

UTL-4 BE LOCATED SUCH THAT THERE ARE INSUFFICIENT WATER SUPPLIES AVAILABLE TO SERVE THE PROJECT FROM EXISTING ENTITLEMENTS AND RESOURCES, OR REQUIRE NEW OR EXPANDED ENTITLEMENTS

Less than significant for construction; less than significant for operations

CONSTRUCTION (ALL REACHES). The proposed project is a non-consumptive flood improvement project and construction would not require new water supplies or entitlements. Water would be used during construction for control of fugitive dust, but since recycled water is readily available it would be used for this purpose; supplies of fresh water would not be affected. No new or expanded entitlements would be required. This impact would be less than significant.

OPERATION (ALL REACHES). During project operation, water may be needed during the first 2 years after construction to irrigate newly installed vegetation. It is anticipated that native shrubs planted as container stock would require a maximum of 5 gallons of water per week and larger trees would require up to 10 gallons of water per week during the 2-year establishment period. Assuming that up to 200 trees and 200 shrubs would be planted to replace removed native trees/shrubs (See Appendix F), up to 3,000 gallons of water would be needed per week during the dry period of May through October, or about 78,000 gallons each year during the establishment period. USACE would irrigate the newly planted trees and shrubs by use of a water truck and using recycled water, which is readily available. No new or expanded entitlements would be required. This impact would be less than significant.

UTL-6 BE SERVED BY A LANDFILL WITH INSUFFICIENT PERMITTED CAPACITY TO ACCOMMODATE THE PROJECT'S SOLID WASTE DISPOSAL NEEDS

Less than significant for construction; less than significant for operations

CONSTRUCTION (REACHES 1–3). Up to 74,500 cubic yards of solid wastes in the form of concrete, soil, vegetation, and reinforcing steel would be excavated and hauled to one or more disposal facilities that are licensed to accept such materials and which have sufficient capacity to accept them.

Table 3.40 shows the total capacity and remaining capacity at each of these landfills. The first choice for disposal facilities is the Newby Island Landfill, located in San Jose. The disposal quantities under the proposed project would amount to approximately 0.5 percent of remaining capacity at Newby Island, an amount that would not adversely affect this landfill's capacity. The excess soil generated during project construction would be re-used at other construction sites or hauled to a licensed landfill for disposal. Because the soil would be clean material suitable for construction re-use, the construction contractor would have economic motivation to sell the soil for reuse at other construction sites. If other construction projects cannot accept the excess soil, it would as a last report be hauled to a licensed landfill where it would be suitable for use as landfill cover material. If re-used at other construction sites or used as cover, the excess soil would not reduce the capacity of the landfill to dispose of other waste materials.

Similarly, there is sufficient capacity and sufficient annual throughput capacity at most other local landfills to handle the disposal quantities generated by the proposed project. However, the Zanker Material Processing Facility and the Zanker Road Resource Recovery Operations Landfill are smaller landfills with limited capacity, and disposal quantities at these facilities could reduce their overall capacity considerably. However, it is unlikely that the entire amount of disposed materials would go to either of these facilities, as they do not accept contaminated soils. Therefore, in the unlikely event that either of these facilities were used as the primary disposal location for uncontaminated soils, actual disposal amounts at these facilities would be much lower than shown in Table 3.40, and impacts from disposal of excavated materials would be less than significant.

Table 3.40 Capacity of Landfills in the Project Vicinity

Landfill	Total Capacity (Cubic Yards)	Remaining Capacity (Cubic Yards)	Percent Remaining Capacity Used (Proposed Project)
Guadalupe Sanitary Landfill	28,600,000	11,055,000	0.8
Kirby Canyon Recycling and Disposal Facility	57,271,507	36,400,000	0.2
Newby Island Landfill	50,800,000	18,274,953	0.5
Zanker Material Processing Facility	540,100	477,100	20
Zanker Rd. Resources Recovery Operations Landfill	1,300,000	700,000	13
Altamont Landfill and Resource Recovery	62,000,000	45,720,000	0.2
Vasco Rd. Sanitary Landfill	32,970,000	7,959,079	1.2

CONSTRUCTION (REACH 4). Up to 15,500 cubic yards of solid wastes in the form of concrete, soil, vegetation, and reinforcing steel would be excavated and hauled to one or more disposal facilities that are licensed to accept such materials and which have sufficient capacity to accept them. As discussed under Reaches 1–3, there is sufficient capacity and sufficient annual throughput capacity at local landfills; therefore, impacts would be less than significant.

OPERATIONS (ALL REACHES). The proposed project would not result in increased generation of solid waste during operations and maintenance; therefore, impacts would be less than significant.

UTL-7 FAIL TO COMPLY WITH FEDERAL, STATE, AND LOCAL STATUTES AND REGULATIONS RELATED TO SOLID WASTE

Less than significant for construction; less than significant for operations

CONSTRUCTION (REACHES 1–3). The project is being designed in compliance with all Federal, State, and local statutes regarding solid waste. Solid waste impacts would be less than significant.

CONSTRUCTION (REACH 4).
The proposed project would be implemented in compliance with all Federal, State, and local statutes and regulations regarding solid waste. Therefore, this impact would be less than significant.

OPERATIONS (ALL REACHES). As mentioned above, excavated sediment quantities would be reduced relative to current conditions. The proposed project would be implemented in compliance with all Federal, State, and local statutes and regulations regarding solid waste. Therefore, this impact would be less than significant.

3.16.6. Mitigation Measures

If needed to offset potential impacts associated with disposal of contaminated groundwater during construction, the project sponsors will implement Mitigation Measure HWM-C.

3.16.7. Statement of Impact

Potential impacts associated with utilities and service systems are summarized in Table 3.41.

Table 3.41 Statement of Impacts, Utilities and Service Systems			
Impact	**Before Mitigation**	**Mitigation Measures**	**After Mitigation**
UTL-1. Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board	S	HWM-C	LM
UTL-2. Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects	LS	None	LS
UTL-3. Require or result in the construction of new stormwater drainage facilities, or expansion of existing facilities, the construction of which could cause significant environmental effects	NI	None	NI
UTL-4. Have insufficient water supplies available to serve the project from existing entitlements and resources, or if new or expanded entitlements are required	LS	None	LS
UTL-5. Result in a determination by the wastewater treatment provider which serves or may serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments	LS	None	LS
UTL-6. Be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs	LS	None	LS
UTL-7. Fail to comply with Federal, State, and local statutes and regulations related to solid waste	LS	None	LS
NI–No Impact, LS–Less than Significant, LM–Less than Significant with Mitigation, S–Significant, SU–Significant and Unavoidable			

3.17. HYDROLOGY AND WATER QUALITY

This section describes each of the environmental conditions associated with the presence of a seasonal water way, including the geomorphology of the creek bed, hydrology and hydraulics, and water quality.

3.17.1. Environmental Setting

Section 2.1 provides general information about the regional and local setting of the project and the engineering design. Numerous hydraulic studies were performed for this project by the District and the USACE, as described in Section 2.1. These studies characterized the Upper Berryessa Creek channel as unable to contain base flows, and identified areas where flooding was likely to occur. The following section provides a more detailed discussion of the existing hydrology and flooding, and characterizes water quality and groundwater in the project area.

3.17.2. Existing Conditions

3.17.2.1. *Geomorphology*

Prior to development of the Coyote Creek Watershed, Berryessa Creek was an ephemeral, braided stream that spread over an alluvial fan with little or no defined channel. Within the project area, Upper Berryessa Creek occupies a constructed channel that is heavily constrained by bridges, bank protection, channel lining, and other constructed features. Thus, channel dimensions are more a result of these influences as opposed to natural geomorphic processes. The project location is situated on an alluvial fan that comprises much of the Santa Clara Valley. Within the valley reach, which coincides with the

project area, the channel gradient averages less than 1 percent. By contrast, stream gradients in the creek upstream from the project area reach as high as 6 percent (USACE 2014). The channel leaves the uplands at a gradient of about 3 percent and gradually reduces to a slope on the order of 1 percent at I-680. However, below I-680, the gradient abruptly decreases by a factor of 3 to 0.35 percent between I-680 and Montague Expressway. Below Montague Expressway, the slope increases to approximately 0.5 percent. Channel gradients within the project reaches are as follows:

- I-680 to Montague Expressway (Reach 4): 0.0035
- Montague Expressway to Calaveras Boulevard (Reaches 1–3): 0.0049

There are numerous bed controls throughout the project reach. These are formed by bridges or box culverts with concrete bottoms, drop structures, and segments of channels lined with concrete. Bed controls in the form of concrete bottoms are found primarily in the upstream part of Reach 4, which is concrete-lined, and under the bridges at Montague Expressway, UPRR trestle, Los Coches Street, and Calaveras Boulevard.

3.17.2.2. *Hydrology and Flooding*

The Berryessa Creek watershed covers 22.4 square miles in northeastern Santa Clara County. Berryessa Creek flows westerly from its origin in Mt. Hamilton of the Diablo Range through the Cities of San Jose and Milpitas. It then turns north and channels into Lower Penitencia Creek, which is a tributary to Coyote Creek that flows into San Francisco Bay. The basin consists of a large proportion of flat valley and foothill areas that have been urbanized and a significant percentage of steep mountainous areas that are utilized primarily for agricultural and resource extraction purposes. Within the project area, two small channelized tributaries, Arroyo de los Coches and Piedmont Creek, flow to Berryessa Creek from the east at Los Coches Street and about 250 yards north of Yosemite Drive, respectively.

Previous flood control efforts and adjacent development have significantly altered Upper Berryessa Creek. Raised banks and concrete-lined portions of the stream channel have resulted in significant modification and channelization. The creek flows through numerous culverts at road crossings and the gradient is controlled by several engineered drop structures. Upper Berryessa Creek is identified as an intermittent blue-line water by the USGS National Hydrography Dataset (USGS 2014). Upper Berryessa Creek flows throughout its length during the rainy season, especially after heavy rainfalls. Portions of the creek may retain water throughout the year as a result of summer runoff from urban areas. Upper Berryessa Creek is not tidally influenced, nor does it generally contain common wetland characteristics.

When present, water generally moves down-gradient from the south to the north. The hydrologic regime has been highly altered from the surrounding hardscaped urban environment and alterations of the stream channel designed to efficiently convey flow. These conditions result in surface water existing only as punctuated flows during the wet season or as artificial inputs from the urban environment during the dry season. ~~Numerous~~ At least thirteen storm drains empty directly into ~~the system~~Upper Berryessa Creek and others empty into its tributary streams, which ~~is~~ are surrounded by impervious and compacted surfaces.

The ~~existing~~ Upper Berryessa Creek channel has insufficient capacity to convey all of the flow during large storm events. When flows greater than an approximately 5-year recurrence interval occur, flow overtops the banks and spills onto the floodplain at some locations. This allows significant attenuation of the flood hydrograph, reducing the peak flow downstream of breakout locations, but causes some

flooding of the adjacent properties. Stormwater flooding inundating streets and yards is estimated to occur in the Berryessa Creek watershed on an average of at least once every 4 years. Overflow channel flooding that causes damage to structures and infrastructure is estimated to occur on the average of once every 10 to 20 years (USACE 2014).

REACHES 1–3, CALAVERAS BOULEVARD TO MONTAGUE EXPRESSWAY (7,800 FEET). The existing channel through Reaches 1, 2, and 3 is a straight, excavated earthen channel through an industrial area of Milpitas. Although it was presumably excavated as a trapezoidal channel, in some areas erosion and incision have resulted in the formation of steep, near vertical banks. The channel averages on the order of 10 to 12 feet in depth. The top width varies from a narrow 35 feet near the railroad trestle to on the order of 50 feet in other locations. The channel conveyance capacity ranges from 1,300 to 2,500 cubic feet per second (cfs).

Reach 1 extends from Calaveras Boulevard to Los Coches Bridge (500 feet). The existing channel in Reach 1 is generally of a trapezoidal shape with bank erosion occurring in various areas. The inflow of Los Coches Creek adds to the limited capacity of the existing channel and the Calaveras Bridge capacity. However, overflows from the upstream reach below Piedmont Creek somewhat reduce the flood threat in the reach. Still, the Calaveras Boulevard Bridge could be overtopped from coincident Berryessa and Los Coches Creek flows. There is essentially no floodplain in this reach.

Reach 2 extends from Los Coches Bridge to Piedmont Creek (2,150 feet). The existing channel in Reach 2 is generally of a trapezoidal shape with bank erosion occurring in various areas. The inflow from Piedmont Creek and a low 1,500-foot segment along the left bank result in channel overflows from an estimated 5-year event. The overflows cause shallow flooding but significant damage to nearby commercial and industrial buildings and their contents. There is essentially no floodplain or riparian zone in this reach.

Reach 3 begins at Piedmont Creek and extends to Montague Expressway (5,150 feet). Reach 3 has an earthen, generally trapezoidal-shaped channel with bank erosion along parts of the stream. The channel is estimated to have the capacity to carry the 25-year event with reasonable certainty. Overflows occurring in Reach 4 upstream of Montague Expressway limit the channel flows through this reach. The Union Pacific Railroad trestle crossing the channel is in poor condition and restricts the top width of the channel to 35 feet, the narrowest point within the project channel. There is a breakout resulting from backwater at the trestle just downstream of Montague Expressway and another breakout near the Yosemite Drive Bridge. There is essentially no floodplain in this reach.

REACH 4 – MONTAGUE EXPRESSWAY TO 1-680 (3,450 FEET). The channel in Reach 4 is an earthen trapezoidal shape from under I-680 through the Montague Expressway Bridge. The two 90-degree bends are concrete-lined showing areas of bank erosion at the transitions. The channel through the 90-degree bends has the capacity to carry only a 20- to 25-year event with reasonable certainty. The channel is approximately 40 feet wide with a depth of 7 to 8 feet. The conveyance capacity ranges from 800 to 1,500 cfs. Flows breaking out of the main channel would flow to the areas of lowest elevation near Lower Penitencia Creek and continue north to its confluence with Berryessa Creek. These overflows would cause significant damage to commercial and industrial structures and contents. If no actions are taken, the future flood threat and bank erosion would continue.

3.17.2.3. *Water Quality*

The stream is intermittent, with intermittent flow in winter and low to no flow in summer above the Piedmont Creek confluence. Winter flows tend to be turbid due to sediment loading from the surrounding foothills and from bank erosion along the creek. Sources of summer flows include runoff from the watering of lawns, industrial discharges, and limited groundwater discharge. Low summer flows lead to stagnant water conditions, low dissolved oxygen content, and higher water temperatures. The creek is completely dry within the project reach during the summer and fall months. Existing environmental conditions affecting water quality of the creek include adjacent urban development and soil contamination; limited flows in long reaches of the channel; lack of riparian habitat or shading; and almost complete disconnection from the floodplain.

Water temperature measured in the creek ranged from 38.3 to 84.7°F, depending on the season and location (Tetra Tech 2003). Average temperatures from December through March were 55.1°F in the project reach. Average temperatures in the summer were 69.7°F, with the maximum water temperature reaching 84.7°F.

Berryessa Creek is not reported on the 303(d) list of impaired waters. Coyote Creek, to which Berryessa Creeks flows, is listed as impaired for Diazinon from urban runoff/storm sewers, and for trash from illegal dumping and urban runoff/storm sewers (SWRCB 2010).

3.17.2.4. *Groundwater*

The Santa Clara subbasin, which is part of the Santa Clara Valley basin, is the primary source of groundwater for the Santa Clara Valley and the project area. Generally, the Santa Clara subbasin is divided vertically into two major aquifers separated by an aquitard, or thick layer of clay or non-porous rock, which ranges in depth from approximately 75 feet bgs in the upper watershed to 160 feet bgs in the northern interior portion of the subbasin (Todd and KJC 2009). This layer of clay retards the movement of groundwater between the two aquifers. The upper aquifer is considered to be unconfined, whereas the lower aquifer is a confined or semi-confined aquifer. The lower aquifer provides much of the municipal and domestic groundwater supply and the upper, unconfined aquifer is currently not used for water supply.

Prior to 1965, the Santa Clara Valley subbasin experienced substantial land subsidence due to groundwater overdraft. In 1965, State water deliveries to the San Jose area began and reduced the rate of subsidence. Berryessa Creek and its tributaries are located in the outer margin of the zone affected by land subsidence and experienced from 0 to 4 feet of subsidence from 1900 to 1967 (Winzler and Kelly 2010).

The District, which is the water supply agency for the region and manages the groundwater basin, actively promotes aquifer recharge through its percolation ponds to avoid overdraft of the aquifer, as well as to minimize future subsidence and saltwater intrusion from San Francisco Bay. There are three ponds located within the Coyote Watershed, on Upper Penitencia Creek and Coyote Creek that ultimately provide groundwater recharge of the lower, confined aquifer. These ponds are generally located in natural recharge areas for the lower aquifer (i.e., in-stream and off-stream sand and gravel deposits that occur at the margins of the Santa Clara subbasin). None of these ponds are located in the project area. In both the foothill (margins) areas, as well as the Santa Clara valley floor, surface water generally infiltrates unlined streambeds and recharges the ground water supply during portions of the

year. In some parts of the flatlands, the groundwater table of the unconfined aquifer approaches the ground surface during the rainy season.

For more than 20 years, the District has monitored wells regularly throughout the Santa Clara Valley. In 2009, a relatively dry year, the station designated in Milpitas (State Well 06S01W24H015), which is west of the project area, had groundwater elevations at the surface in March and then at depths of approximately 9 feet and 11 feet in July and August, respectively (SCVWD 2010). The increased aquifer recharge and the decreased pumping of the aquifer, compared to levels in the 1980s, contribute to unconfined groundwater levels that are relatively high in the project area.

The project area is generally characterized by relatively shallow groundwater, with the unconfined aquifer extending to 40 feet bgs. There have been a number of historical incidents involving the release of hazardous chemicals into the soil and groundwater in the vicinity of the project (see Section 3.9 Hazardous Materials for additional information). Analysis of groundwater adjacent to the creek channel has confirmed the presence of VOCs, including TCE, TCA, and PCE, as well as aromatics and petroleum hydrocarbons in the groundwater.

3.17.3. **Regulatory Setting**

3.17.3.1. *Federal Regulations*

EXECUTIVE ORDER 11988. Under Executive Order 11988, FEMA is responsible for management of floodplain areas, defined as the lowland and relatively flat areas adjoining inland and coastal waters subject to a 1 percent or greater chance of flooding in any given year (the 100-year floodplain). FEMA requires that local governments covered by Federal flood insurance pass and enforce a floodplain management ordinance that specifies minimum requirements for any construction within the 100-year floodplain. Among the criteria for certification under the FEMA National Flood Insurance Program is that the conditional non-exceedance probability of all reaches of the levee system be greater than 90 percent from overtopping of the 1 percent chance exceedance flood event (100-year event). See Local Plans and Policies section below (i.e., Santa Clara County General Plan, Milpitas Municipal Code, and Milpitas General Plan) for details on 100-year floodplain construction requirements for the project area.

FEDERAL AND STATE WATER QUALITY STATUTES AND REGULATIONS. The statutes that govern the activities under the project that may affect water quality and wetlands are the Federal Clean Water Act of 1972, as amended (33 USC §1251, et. seq.), and the Porter-Cologne Water Quality Control Act (CWC §13000 et seq.). Provisions of the CWA provide for delegation by the EPA of many permitting, administrative, and enforcement aspects of the law to State governments. In California, the SWRCB and its associated nine regional water quality control boards implement various CWA programs, including the promulgation of Water Quality Control Plans (Basin Plans) containing California's water quality standards and implementation of the NPDES.

3.17.3.2. *State Regulations*

SAN FRANCISCO BAY WATER QUALITY CONTROL PLAN. The SFBRWQCB adopts and administers the Basin Plan for the San Francisco Bay estuarine system and freshwater tributaries and groundwater resources (SFBRWQCB 2013). In addition to establishing water quality standards, the basin plan contains

implementation programs and policies to achieve those objectives for all waters addressed through the plan (California Water Code, §13240-13247).

Pursuant to the CWA, water quality standards are composed of two parts: (1) the designated beneficial uses of water (Table 3.42) and (2) criteria or objectives to protect those uses from pollution and degradation. Beneficial uses are defined for surface waters, groundwater, and wetlands. Beneficial uses that apply to the project area are summarized in the following table, and definitions are contained in the Basin Plan (2013).

Table 3.42 Beneficial Uses

Beneficial Uses of Waters		Surface Water	Groundwater Basin	Wetland
ABBR.	Name	Berryessa Creek	Santa Clara Valley (Basin 2-9.02)	Undefined Riverine Wetland
REC1	Water Contact Recreation	**E**		**E**
REC2	Noncontact Water Recreation	E		E
WARM	Warm Freshwater Habitat	E		E
WILD	Wildlife Habitat	E		E
AGR	Agricultural Supply		E	E
IND	Industrial Service Supply		E	P
MUN	Municipal and Domestic Supply		**E**	
PROC	Industrial Process Supply		E	
GWR	Groundwater Recharge			E

E = Existing beneficial uses (Basin Plan 2013), P = Potential beneficial uses (Basin Plan 2013)

Water Quality Objectives (WQOs) to protect beneficial uses are both narrative and numerical. Narrative objectives are general descriptions of water quality that must be attained through pollutant control measures and watershed management. Numerical objectives typically describe pollutant concentrations, physical/chemical conditions of the water itself, and the toxicity of the water to aquatic organisms. These objectives represent the maximum amount of pollutants that can remain in the water column without causing any adverse effect on organisms using the aquatic system as habitat, on people consuming those organisms or water, and on other current or potential beneficial uses. Together, the narrative and numerical objectives define the level of water quality that shall be maintained within the region. Representative applicable WQOs for surface and ground waters in the project area are shown in Table 3.43.

Table 3.43 Water Quality Objectives

Factor	Objective	Applicability	Note
Dissolved Oxygen	5.0mg/l min	Warm water habitat	A general index of the state of the health of receiving waters
Floating Material	none	Surface waters	Includes solids, liquids, foams, scum, in concentrations that cause nuisance or adversely affect beneficial uses.
Oil and Grease	No visible film	Surface waters	No visible film on the surface or on objects in the water that cause nuisance or adversely affect beneficial uses.
Toxic Substances	Not lethal or significant	Surface waters	Free of toxic substances in concentrations that are lethal to or that produce significant alterations in population or community ecology or receiving water biota
pH	6.5 – 8.5	Surface waters	Controllable water quality factors shall not cause changes greater than 0.5 units in normal ambient pH levels.

Factor	Objective	Applicability	Note
Salinity	No increase	Surface waters	Controllable water quality factors shall not increase the total dissolved solids or salinity of waters of the state so as to adversely affect beneficial uses
Sediment	Not altered	Surface waters	The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses. Controllable water quality factors shall not cause a detrimental increase in the concentrations of toxic pollutants in sediments or aquatic life.
Settleable Material	No nuisance	Surface waters	No substances in concentrations that result in the deposition of material that cause nuisance or adversely affect beneficial uses.
Suspended Material	No nuisance	Surface waters	No suspended material in concentrations that cause nuisance or adversely affect beneficial uses.
Temperature	No increase greater than 5*F	Warm water habitat	The temperature of any […] warm freshwater habitat shall not be increased by more than 5°F (2.8°C) above natural receiving water temperature
Turbidity	No nuisance	Surface waters	Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses.
Trichloroethylene (TCE)	0.005 MG/L	Municipal supply	None
Tetrachloroethylene (PCE)	0.005 MG/L	Municipal supply	None
1,1-Dichloroethane (1,1-DCA)	0.005 MG/L	Municipal supply	None
1,1-Dichloroethylene (1,1-DCe)	0.006 MG/L	Municipal supply	None

GROUNDWATER. Groundwater quality is regulated by the SFBRWQCB (SFBRWQCB 2013). The primary water quality objective for groundwater is maintenance of the existing high quality of groundwater (i.e., "background"). In addition, at a minimum, groundwater shall not contain concentrations of bacteria, chemical constituents, radioactivity, or substances producing taste and odor in excess of the objectives described above unless naturally occurring background concentrations are greater. Under existing law, the Water Board regulates waste discharges to land that could affect water quality, including both groundwater and surface water quality. Waste discharges that reach groundwater are regulated to protect both groundwater and any surface water in continuity with groundwater. Waste discharges that affect groundwater that is in continuity with surface water cannot cause violations of any applicable surface water standards. The project is located within the Santa Clara Subbasin of the Santa Clara Valley Basin (Basin 2-9.02), which is protected as a municipal supply.

ANTIDEGRADATION POLICY. In instances where existing water quality is better than that prescribed by the objectives, the State Antidegradation Policy applies (State Board Resolution 68-16: Statement of Policy with Respect to Maintaining High Quality of Waters in California). The Antidegradation Policy states that "whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality would be maintained until it has been demonstrated to the State that any change would be consistent with maximum benefit to the people of the State, would not unreasonably affect present and anticipated beneficial use of such water, and would not result in water quality less than that prescribed in the policies." Any activity which

produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters would be required to meet waste discharge requirements which would result in the best practicable treatment or control of the discharge necessary to assure that a pollution or nuisance would not occur and the highest water quality consistent with maximum benefit to the people of the State would be maintained.

CONSTRUCTION GENERAL PERMIT. California regulations require that discharges of stormwater associated with construction activity disturbing more than one acre become permitted under the General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order 2009-009-Division of Water Quality), known as a Construction General Permit. This permit requires the development and implementation of a SWPPP. The SWPPP must list BMPs that the contractor would use to control stormwater runoff and reduce erosion and sedimentation. A sediment monitoring plan is also required if the site discharges to a water body with impaired or limited water quality (State Water Resources Control Board 2005d). The San Francisco Bay Regional Water Quality Control Board may also issue site-specific waste discharge requirements (WDRs), or waivers to WDRs, for certain waste discharges to land or waters of the State.

Construction activities subject to the Construction General Permit include clearing, grading, stockpiling, and excavation. Dischargers are required to eliminate or reduce non-stormwater discharges to storm sewer systems and other waters. The permit also requires dischargers to consider the use of post-construction permanent BMPs that would remain in service to protect water quality throughout the life of the project. Types of BMPs include source controls, treatment controls, and site planning measures.

CWA SECTIONS 404 AND 401. Section 404 of the Clean Water Act requires the USACE regulatory section to issue Section 404 permits for discharges of dredged or fill material into waters of the U.S. Although the USACE does not process and issue Section 404 permits for its own activities (such as construction of the proposed project), it authorizes its own discharges by applying all substantive legal requirements and by conducting a Section 404(b)(1) Guidelines analysis. 33 CFR 336.1(a).Under the Section 404(b)(1) Guidelines, a proposed discharge is not allowed if there is a less environmentally damaging practicable alternative that would have less effect on the aquatic ecosystem, and not have other significant adverse environmental impacts (40 CFR 230 et seq).

USACE regulations generally require USACE to seek Section 401 water quality certification for USACE projects involving a discharge into waters of the U.S. even though USACE does not issue itself a Section 404 permit. However, the project, as a project authorized by Congress that has completed an EIS, qualifies for exemption under 33 U.S. Code 1344(r). USACE will either obtain a Section 401 water quality certification or claim exemption under 33 U.S. Code 1344(r) for the proposed project.

3.17.3.3. *Local Plans and Policies*

SANTA CLARA COUNTY GENERAL PLAN. The Santa Clara County General Plan (Santa Clara County 1994) identifies the following principles and policies that relate to the proposed project:

- *Policy C-RC 20*. Adequate safeguards for water resources and habitats should be developed and enforced to avoid or minimize water pollution of various kinds, including: a. erosion and sedimentation; b. organic matter and wastes; c. pesticides and herbicides; d. effluent from inadequately functioning septic systems; e. effluent from municipal wastewater treatment plants; f. chemicals used in industrial and commercial activities and processes; g. industrial wastewater discharges; h. hazardous wastes; and i. non- point source pollution.

- *Policy C-HS 34*. Flood control measures should be considered part of an overall community improvement program and advance the following goals, in addition to flood control: a. resource conservation; b. preservation of riparian vegetation and habitat; c. recreation; and d. scenic preservation of the County's streams and creeks.
- *Implementation Recommendations C-HS (i) 32*. Continue efforts by, and joint planning with, the District to design and construct flood control improvements that achieve a desirable balance of resource conservation, flood control, and recreational objectives.

CITY OF MILPITAS MUNICIPAL CODE. The City of Milpitas Municipal Code (2010), Section XI-15, identifies the following provisions for flood hazard reduction that relate to the project:

- *XI-15-5.1b Standards of Construction*: Construction Materials and Methods
    - (b1) With materials and utility equipment resistant to flood damage.
    - (b2) Using methods and practices that minimize flood damage.
- The other provisions for flood hazard reduction are not relevant to the project (i.e., construction of utilities, subdivisions, manufactured homes, and recreational vehicles).

CITY OF MILPITAS GENERAL PLAN. The City of Milpitas General Plan (2002) identifies the following principles and policies that relate to the proposed project:

- *5.b-G-1* Minimize threat to life and property from flooding and dam inundation.
- 5.b-I-1 Ensure that new construction or substantial improvements to any existing structure result in adequate protection from flood hazards.
- *5.b-I-3* Ensure that encroachment into designated floodways does not result in any increase in flooding hazards.
- *5.b-I-5* Seek construction of flood control channels to withstand 100-year floods along Coyote, Penitencia, Berryessa, Scott, Calera, and Los Coches Creeks.
- *4.d-G-1* Protect and enhance the quality of water resources in the Planning Area.
- *4.d-I-1* Continue implementing the National Pollutant Discharge Elimination System (NPDES) requirements of the Regional Water Quality Control Board. - *This is implemented through Chapter 16 of the City's Zoning Ordinance.*

CITY OF SAN JOSE GENERAL PLAN. The San Jose General Plan (2011) specifies that protection from a 0.01 exceedance probability flood 100-year flood should be achieved in accordance with the Federal Flood Insurance Program design standards.

3.17.4. Significance Criteria

Implementation of the proposed project would be considered to have significant adverse effects on water quality if it were to:

WAQ-1 Violate any water quality standard or waste-discharge requirement;

WAQ-2 Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing wells would drop to a level that would not support existing land uses or planned use for which permits have been granted);

WAQ-3 Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river in a manner that would result in substantial erosion or siltation on- or off-site;

WAQ-4 Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the amount or rate of surface runoff, in a manner that would result in flooding on- or off-site;

WAQ-5 Create or contribute runoff water, which would exceed the capacity of existing or planned storm water drainage systems, provide substantial additional sources of polluted runoff,

WAQ-6 Otherwise substantially degrade water quality;

WAQ-7 Place housing within a 100-year flood hazard area as mapped on Federal Flood Hazard Boundary or Flood Insurance Rate Maps or other flood hazard delineation maps;

WAQ-8 Place within a 100-year flood hazard area structures that would impede or redirect flood flows;

WAQ-9 Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam; or

WAQ-10 Expose people or structures to a significant risk of loss, injury, or death involving inundation by seiche, tsunami, or mudflow.

3.17.5. Potential Impacts

3.17.5.1. *Significance Criteria with No Impact*

The following significance criteria are not discussed further in the EIR because the proposed project would not result in impacts related to these criteria:

WAQ-7 **Place housing within a 100-year flood hazard area as mapped on Federal Flood Hazard Boundary or Flood Insurance Rate Maps or other flood hazard delineation**. The proposed project would not involve the construction of new housing and would decrease, not increase, the flood hazard area in the project vicinity. No existing housing would come within the flood hazard area as a result of the project.

WAQ-8 **Place within a 100-year flood hazard area structures that would impede or redirect flood flows.** The intent of the proposed project is to reduce flood potential by redesigning the channel and structures within the channel to pass flood flows more efficiently. Any new structures within the channel are replacing existing structures and are being designed in accordance with FEMA requirements for passage of flood flows and would exceed USACE requirements for passing flows occurring under the 100-year discharge.

WAQ-9 **Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam**. There are no levees or dams in the construction area and none are proposed other than small temporary cofferdams that would be constructed for dewatering purposes during construction. These dams would hold back only small amounts of water that would then be pumped around the construction area. Failure of these dams is not expected and the amount of water released in the event of cofferdam failure could be accommodated by the downstream creek channel, thus the project would not result in significant flood risk or potential for loss of property or life.

WAQ-10 **Expose people or structures to a significant risk of loss, injury, or death involving inundation by seiche, tsunami, or mudflow**. The construction area is not vulnerable to seiche or tsunami, and there are no project features that would increase exposure of people or structures to such occurrences. Mudflows are an extremely rare event in this

area. Any mudflows would originate in upstream areas and would be blocked by upstream features before making their way to the project area.

3.17.5.2. *Significance Criteria with Potential Impacts*

WAQ-1 VIOLATE ANY WATER QUALITY STANDARD OR WASTE-DISCHARGE REQUIREMENT

Less than significant with mitigation for construction; less than significant for operations

AND,

WAQ-6 OTHERWISE SUBSTANTIALLY DEGRADE WATER QUALITY

Less than significant with mitigation for construction; less than significant for operations

CONSTRUCTION (REACHES 1–3). Construction activities in Reaches 1–3 would entail the use of heavy equipment and associated hazardous materials, such as fuels (gasoline and diesel), oils and lubricants, and cleaners (e.g., solvents, corrosives, soaps, detergents), which are commonly used in construction projects. During construction, accidental spills could occur, potentially causing a discharge of hazardous materials to surface or groundwater and violating water quality standards. Preparation of the site prior to construction would require clearing and grubbing, which may require the use of herbicides which could be sprayed or spilled into surface waters.

Several components of the project would include construction with concrete within the channel. Uncured concrete is extremely alkaline, and if it were spilled or came into contact with creek water during the curing period, it would degrade water quality and could cause a violation of water quality standards.

Ground-disturbing activities during construction could result in soil erosion and input of sediment into water sources. Under the proposed project, ground-disturbing activities or those that could otherwise contribute to erosion risk include:

- Demolition and excavation of concrete and earthen materials;
- Demolition of concrete paved channel bed and side slope protection features;
- Widening of channel bed and top of banks via excavation and grading of earthen material;
- Excavation of channel bed and side slopes for placement of rock revetment;
- Use of heavy equipment for hauling away of concrete debris and excavated material;
- Stockpiling of excavated materials or soils to be used for backfill; and
- Excavation for reconstruction of access roads.

Soils in the area would be disturbed during construction as a result of material excavation along the creek bed and banks, and during construction and use of access roads. Erosion may also occur at staging areas, where initial grading to flatten the site, and subsequent disturbance by construction equipment would destabilize soils, leaving them vulnerable to erosion. Soils stockpiled for reuse or before they are hauled off for disposal would be especially vulnerable to erosive effects of wind and rain. As soils in the project area are relatively easily erodible, even soils that are stockpiled properly may erode as a result of rain or high winds. Impacts associated with excessive erosion include degraded water quality and excessive sedimentation. Erosion would be limited by performing construction actions during the dry months. The construction contractor would prepare and implement a SWPPP to reduce the potential for erosion of disturbed areas. However, given the size of the project footprint, the soil erosion could result in washing of large quantities of soil into the creek channel, substantially degrading downstream

water quality. This impact would be most likely during periods of substantial rainfall when the amount of water flowing in the creek would increase greatly. This could result in substantial erosion and inundation of equipment and materials working in the creek, causing downstream flow of entrained pollutants. This impact would be significant.

Dewatering of surface or groundwater that accumulates at excavated areas would likely be necessary to allow construction to occur in the dry, particularly in Reaches 1 and 2, where water flow is more persistent, and in Reach 3 where deeper excavations for the replacement of the UPPRR trestle are more likely to encounter groundwater (Tetra Tech 2015h). Extracted groundwater at the UPRR trestle area (i.e. in the JCI off-site area) may be contaminated with VOCs as described in Section 3.9.5. Construction also would entail excavating and moving channel sediment, which may be contaminated by VOCs, petroleum products, and other hazardous substances, within the channel, which could result in accidental discharge of hazardous substances to surface or groundwater. Impacts to surface and groundwater quality would be significant; see Section 3.9.

All groundwater, surface flows and runoff would be captured, diverted around the construction site and discharged downstream. Surface flows in the creek would be temporarily detained behind a cofferdam prior to being pumped around the construction site. Detention could result in changes to dissolved oxygen levels, turbidity, temperature, and pH that would adversely affect the quality of the downstream receiving waters. All dewatering activities would be temporary and confined to the smallest possible area. These diversions would remain in place throughout the in-stream construction period. All dewatering activities would discharge to the stream channel downstream of the construction site. This type of discharge may induce erosion and sedimentation in the stream channel, diminishing water quality at discharge locations and constituting a significant impact.

CONSTRUCTION (REACH 4). Construction activities in Reach 4 would entail most of the same types of impacts as in Reaches 1–3, including from construction of concrete structures within the channel. Groundwater occurs at greater depths than in downstream reaches and it is unlikely, but still possible, that groundwater would be encountered during excavations. No known areas of contaminated groundwater occur in this reach so the chances of encountering soils or groundwater contaminated with VOCs or petroleum products are low. Therefore, potential impacts from dewatering or groundwater extraction would be less than significant in this reach.

OPERATIONS (ALL REACHES). Operation of the proposed project is non-consumptive in terms of water needs, other than needs to irrigate vegetation during a 2-year establishment period. Ongoing maintenance and operations actions would continue after construction, but actions associated with sediment removal and erosion control would be reduced due to a more efficient channel design. Newly required maintenance actions including inspection of the floodwall, culverts, and access roads would not require excavation or dewatering, so operational impacts associated with dewatering or groundwater extraction would not occur under the proposed project.

MITIGATION (ALL REACHES). Significant water quality impacts of spills would be mitigated by Mitigation Measure HWM-A (Prepare spill prevention and response plan).

Significant water quality impacts from construction activities would be mitigated by implementing Mitigation Measures WAQ-A (Implement measures for protecting water quality), WAQ-B (Prepare and implement a dewatering plan, and WAQ-C (Prepare and implement a rain event action plan).

Significant water quality impacts from discharge of contaminated groundwater encountered during construction would be mitigated by implementing Mitigation Measure HWM-C (Treat VOC--contaminated groundwater encountered at JCI off-site area).

SIGNIFICANCE AFTER MITIGATION. With the implementation of Mitigation Measures WAQ-A, WAQ-B, WAQ-C, HWM-A, and HWM-C the project would be in compliance with water quality and waste discharge requirements, so impacts associated with violation of water quality standards or substantial degradation would be reduced to a less than significant level.

Significant water quality impacts from construction site runoff would be reduced to less than significant levels through implementation of Mitigation Measures WAQ-A (Implement Measures For Protecting Water Quality) and WAQ-C (Prepare and Implement a Rain Event Action Plan). WAQ-A requires isolation of concrete from runoff or creek water after pouring and maintaining a clean work site. WAQ-C requires measures to prevent washing of contaminants into the creek channel during substantial rain events.

Significant water quality impacts of dewatering activities would be mitigated to a less than significant level by implementing Mitigation Measure WAQ-B (Prepare and Implement a Dewatering Plan). The dewatering plan would include specific measures to prevent significant increases in water temperature, lower dissolved oxygen levels, and increased turbidity.

Significant water quality impacts of spills would be mitigated to a less than significant level by implementing Mitigation Measure HWM-A (Prepare and Implement a SPRP), because the spill prevention and response plan would reduce the likelihood of spills, and minimize water quality impacts if a spill were to occur.

Significant water quality impacts from discharge of contaminated groundwater if encountered would be mitigated to a less than significant level through treatment of the groundwater as required by Mitigation Measure HWM-C (Treat VOC-Contaminated Groundwater Encountered at JCI Off-Site Area). The treated groundwater would meet water quality standards before discharge to the creek.

WAQ-2 SUBSTANTIALLY DEPLETE GROUNDWATER SUPPLIES OR INTERFERE SUBSTANTIALLY WITH GROUNDWATER RECHARGE SUCH THAT THERE WOULD BE A NET DEFICIT IN AQUIFER VOLUME OR A LOWERING OF THE LOCAL GROUNDWATER TABLE LEVEL

Less than significant for construction; no impact for operations

CONSTRUCTION (ALL REACHES). Construction activities may encounter shallow groundwater. Encountered groundwater would be collected and discharged to the creek downstream of the project area. –The maximum depth of excavation is seven feet, of which five feet would be backfilled after placement of materials to stabilize the toe of the embankment. The average depth of excavation is between 18 inches and 24 inches. The depth of excavation would temporarily affect only the uppermost several feet of groundwater within the shallow aquifer. Groundwater extraction would be limited to water that accumulates around the work area, which would be a minimal amount compared to the aquifer capacity, and which would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge. The water collected would be expected to infiltrate back into the shallow aquifer when discharged to the channel downstream of the construction area. The local shallow aquifer would be temporarily depressed during the construction period, but this impact would be minor and temporary. The proposed project would not decrease the area of groundwater recharge.

Conversely, by enlarging the channel, it would increase the amount of water from the creek infiltrating into the soil and recharging the groundwater aquifer. Considering the overall result of all these effects, this impact would be less than significant because the proposed project would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge.

OPERATION (ALL REACHES). The proposed project would not adversely affect groundwater recharge or the aquifer volume capacity. Although the final invert elevation of the stream channel may be below the upper elevation of the ground water table under some circumstances, the invert elevation will still be within the historic range of invert elevations, which varies on a seasonal and yearly basis due to localized sediment deposition. If temporary or seasonal drainage of groundwater into the stream occurs, it will not draw the groundwater levels below the range of elevations at which the groundwater table is normally found. No impact on groundwater recharge would result.

WAQ-3 SUBSTANTIALLY ALTER THE EXISTING DRAINAGE PATTERN OF THE SITE OR AREA, INCLUDING THROUGH THE ALTERATION OF THE COURSE OF A STREAM OR RIVER IN A MANNER THAT WOULD RESULT IN SUBSTANTIAL EROSION OR SILTATION ON- OR OFF-SITE

Less than significant for construction; less than significant for operations

CONSTRUCTION (ALL REACHES). Construction activities in and of themselves would not substantially alter drainage patterns. The location of the stream channel would not be altered, and drainage patterns during the construction period would be similar to those occurring under existing conditions. Dewatering would temporarily pass some flows through the system in a pipe rather than through the stream channel, but this would not alter drainage patterns in such a way as to cause substantial erosion or siltation. Therefore, erosion or siltation impacts associated with substantial or permanent alteration of drainage patterns would be less than significant.

The District as landowner will be responsible for obtaining project coverage under the General Permit for Discharges of Stormwater from Construction Sites issued by the California State Water Resources Control Board. The General permit conditions require that the applicant prepare and submit to SWRCB a stormwater pollution prevention plan (SWPPP) covering project construction. The SWPPP will include detailed measures to control erosion, contain sediments, and prevent turbidity and other forms of pollution from contaminating stormwater and being washed into drainages during construction. The SWPPP would ensure compliance with the plan throughout the construction process. Measures from the SWPPP would be incorporated into the contractor's work plan and would be implemented prior to groundbreaking activities. Implementation of the SWPPP would prevent soil erosion during construction and this impact would be less than significant.

OPERATIONS (ALL REACHES). During operations, the effects of enlarging the channel, installing the floodwall, and increasing the conveyance capacity at the bridges would include altered drainage patterns in the project area and downstream. Widening the channel would lead to a lower water surface elevation and reduced velocities during storm flows, which would reduce erosion and streambed incision, reducing sediment input into the system and allowing sediments to settle out more readily. At the same time, reducing flow impedance at the bridges and culverts would allow for more efficient movement of sediment through the system.

Due to the relatively flat stream profile through the project area, Reaches 1-4 would normally be considered a depositional reach (meaning sediment accumulates in the reach), and under low flows it

exhibits characteristics of a depositional reach. However, evidence of extensive erosion within these reaches is found beneath bridges, at oversteepened and failing banks, and in scoured areas downstream of hard structures. Some of these eroded materials likely show up as sediments in the channel bed within Upper Berryessa Creek, while the rest are likely moved downstream and out of the project area.

Although reduced velocities and lower water surface elevations may reduce the sediment transport capacity of the reach to a small degree, this effect is likely to be balanced by decreased erosion and diminished sediment input. According to the sediment transport studies prepared for this project (Tetra Tech 2015g), sediment aggradation would only occur at two locations, the UPRR trestle and UPRR culvert locations. The maximum increase in channel elevation is approximately one foot (for five 10-year events) and the deposition plume would extend approximately 600 feet upstream of the UPRR culvert for a 100-year flood event. According to the sediment transport study, the total depositional volume for the entire reach downstream of I-680 would be less than under current conditions. In addition, the District will continue to follow its Stream Maintenance Program Manual including implementing applicable BMPs during future sediment removal to ensure that effects on water quality or creek habitat, if any, would be less than significant.

Furthermore, any backwater effect that occurs where the downstream end of Reach 1 at Calaveras Boulevard transitions into the Lower Berryessa Creek channel would be eliminated when the Lower Berryessa Creek Program is constructed, further reducing sediment deposition in the lower end of Reach 1. ~~Therefore, while drainage patterns would change significantly as a result of the project, there is not likely to be a~~No significant change in the balance of sediment ~~movement~~ transport versus erosion would result, so this impact would be less than significant.

WAQ-4 SUBSTANTIALLY ALTER THE EXISTING DRAINAGE PATTERN OF THE SITE OR AREA, INCLUDING THROUGH THE ALTERATION OF THE COURSE OF A STREAM OR RIVER IN A MANNER THAT WOULD RESULT IN FLOODING ON- OR OFF-SITE

Less than significant for construction; less than significant for operations

CONSTRUCTION (ALL REACHES). Construction of the proposed project would not substantially alter existing drainage patterns. See construction impact analysis for Impact WAQ-3. The proposed project is designed to pass flood flows more efficiently and to result in increased channel capacity.

OPERATIONS (ALL REACHES). During operations, the effect of enlarging the channel, installing the floodwall, and increasing the conveyance capacity at the bridges would pass flood flows through the Upper Berryessa Creek channel more efficiently (See operations impact analysis for Impact WAQ-3). Increased downstream flood risks associated with increased flood flows from Upper Berryessa Creek would not occur because construction of the proposed project would occur after completion of construction of the Lower Berryessa Creek and Lower Calera Creek Flood Protection Improvements Project, which is designed to provide 1% flow conveyance capacity in the stream reaches starting immediately below Calaveras Boulevard, which marks the downstream extent of the proposed project. Therefore, this impact would be less than significant.

Other operational measures, including vegetation management and inspection of structural features, would continue as needed, and would not alter the drainage patterns or increase flood potential on- or off-site. This impact would be less than significant.

WAQ-5 CREATE OR CONTRIBUTE RUN-OFF WATER, WHICH WOULD EXCEED THE CAPACITY OF EXISTING OR PLANNED STORM WATER DRAINAGE SYSTEMS, OR PROVIDE SUBSTANTIAL ADDITIONAL SOURCES OF POLLUTED RUN-OFF

Less than significant with mitigation for construction; less than significant for operations

CONSTRUCTION (ALL REACHES). Construction of the project in itself would not generate large volumes of stormwater that would exceed the capacity of existing or planned stormwater drainage systems. However, the use of construction equipment, vehicles, and materials in the creek channel would create the potential for substantial increases in polluted runoff during rain events. This impact would be significant.

OPERATIONS (ALL REACHES). The proposed project is intended to facilitate flow of stormwater through the Upper Berryessa Creek area. Therefore, it would reduce the burden on storm drainage systems and not adversely affect the capacity of existing or planned stormwater drainage system. Operations would not add sources of polluted runoff. This impact would be less than significant.

MITIGATION (ALL REACHES). Measures WAQ-A and WAQ-C would reduce the potential for creation of polluted runoff by specifying the removal of potential pollutants from the creek channel or securing them when substantial rain is forecast, thereby preventing storm runoff from entraining pollutants.

SIGNIFICANCE AFTER MITIGATION. Implementing Mitigation Measures WAQ-A and WAQ-C would reduce the potential for creation of polluted runoff and reduce this impact to less than significant.

3.17.6. Mitigation Measures

WAQ-A: IMPLEMENT MEASURES FOR PROTECTING WATER QUALITY The District, working with the USACE, will require the construction contractor to implement the following measures:

- **Limit impact of concrete near waterways.** Concrete will be poured only where it is separated from natural water flows during placement for a period of 30 days afterwards**.** Fresh concrete will be isolated until it no longer poses a threat to water quality using the following appropriate measures:
    1. Poured concrete will be excluded from the wetted channel for a period of four weeks after it is poured. During that time, the poured concrete will be kept moist, and runoff from the wet concrete will not be allowed to enter a live stream. Commercial sealants (e.g., Deep Seal, Elasto-Deck Reservoir Grade) may be applied to the poured concrete surface where difficulty in excluding water flow for a long period may occur. If a sealant is used, water will be excluded from the site until the sealant is dry.
    2. Dry sacked concrete will not be used in any channel.
    3. An area outside of the channel and floodplain will be designated to clean out concrete transit vehicles used in project construction.
- **Maintain clean conditions at work sites**. The work site, areas adjacent to the work site, and access roads will be maintained in an orderly condition, free and clear from debris and discarded materials on a daily basis. Personnel will not sweep, grade, or flush surplus materials, rubbish, debris, or dust into storm drains or waterways.

For activities that last more than one day, materials or equipment left on the site overnight will be stored as inconspicuously as possible, and will be neatly arranged. Any materials and equipment left on the site overnight will be stored to avoid erosion, leaks, or other potential impacts to water quality. Upon completion of work, all building materials, debris, unused materials, concrete forms, and other construction-related materials will be removed from the work site.

WAQ-B. PREPARE AND IMPLEMENT A DEWATERING PLAN. USACE will prepare a plan for dewatering the creek and the return of diverted water to the creek downstream of the construction area. The dewatering plan will specify the size and materials to be used in coffer dams, the size of the dewatering pipes, water sampling and testing protocols, energy dissipation methods to prevent bed scour, and water quality standards to be met before water can be reintroduced to the creek.

WAQ-C. PREPARE AND IMPLEMENT A RAIN EVENT ACTION PLAN.
The District, working with the USACE, will require the construction contractor to implement the following measures. In-channel construction activities will be suspended and a project-specific Rain Event Action Plan (REAP) will be implemented if substantial rainfall, defined as 0.5 inch or greater precipitation, is forecast by the National Weather Service in their 72-hour forecast for the project area. The REAP will be prepared by a qualified SWPPP practitioner and will comply with standards of the California Stormwater Quality Association Best Management Practices Handbook. The REAP will include measures to prevent adverse effects of water flows at construction areas, such as removal of equipment, vehicles, and materials from the channel; protection of exposed and disturbed areas; and isolation of uncured concrete from water flows. Additionally, start of construction phases taking more than 72 hours to complete will not occur if substantial rainfall is forecast.

In addition to measures listed in this section, a number of mitigation measures developed to reduce impacts for other resources will also be implemented to reduce impacts to water resources. They include:

- **HWM-A**: Prepare a Spill Prevention and Response Plan.
- **HWM-C:** Treat VOC-Contaminated Groundwater Encountered at JCI Off-Site Area.

3.17.7. Statement of Impact

A summary of potential impacts to water resources is given in Table 3.44. Significant impacts associated with violations of water quality standards and quality of runoff water were identified. However, by applying mitigation measures specified in Section 3.17.6, these impacts would be reduced to a less than significant level.

Table 3.44 Statement of Impacts, Water Resources			
Impact	**Prior to Mitigation**	**Applicable Mitigation**	**After Mitigation**
WAQ-1. Violate any water quality standard or waste-discharge requirement.	S	HWM-A HWM-C WAQ-A WAQ-B WAQ-C	LM
WAQ-2. Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing wells would drop to a level that would not support existing land uses or planned use for which permits have been granted).	LS	None	LS
WAQ-3. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river in a manner that would result in substantial erosion or siltation on- or off-site.	LS	None	LS
WAQ-4. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river in a manner that would result in flooding on- or off-site.	LS	None	LS
WAQ-5. Create or contribute run-off water, which would exceed the capacity of existing or planned storm water drainage systems, provide substantial additional sources of polluted run-off, or otherwise substantially degrade water quality.	S	WAQ-A WAQ-C	LM
WAQ-6. Otherwise substantially degrade water quality.	S	HWM-A HWM-C WAQ-A WAQ-B WAQ-C	LM
WAQ-7. Place housing within a 100-year flood hazard area as mapped on Federal Flood Hazard Boundary or Flood Insurance Rate Maps or other flood hazard delineation maps.	NI	None	NI
WAQ-8. Place within a 100-year flood hazard area structures that would impede or redirect flood flows.	NI	None	NI
WAQ-9. Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam.	NI	None	NI
WAQ-10. Expose people or structures to a significant risk of loss, injury, or death involving inundation by seiche, tsunami, or mudflow.	NI	None	NI
NI–No Impact, LS–Less than Significant, LM–Less than Significant with Mitigation, S–Significant, SU–Significant and Unavoidable			

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4. CUMULATIVE IMPACTS

4.1. CEQA ANALYSIS REQUIREMENTS

CEQA requires an analysis of cumulative effects which are defined in Section 15355 of the CEQA Guidelines as "' two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts." Such impacts can be caused by two or more projects each with significant effects that are compounded when analyzed together, or can result from projects which are individually minor but are collectively significant.

The analysis of cumulative effects for this project is using the "List Approach (Guidelines Section 15130(b)(1)(A))" under CEQA. The list will identify relevant past, present, and probable future projects. The list may differ by environmental discipline. The analysis by discipline will define the geographic scope of the area, a summary of expected environmental effects, and a reasonable analysis of the cumulative impacts of the relevant projects (Guidelines Section 15130(b)(B)(5)).

The analysis of cumulative effects is based in part on the geographic proximity of the proposed project to other past, present, or reasonably foreseeable future activities. Proximity can differ based on the element of the environment under consideration. For instance, noise impacts are typically limited in geographic scope to locations and receptors that may be affected by construction noise. Effects related to aesthetics, geology, cultural, and hazardous materials would likewise have a fairly limited geographic scope. Air and GHG emissions, on the other hand, may have effects on a much larger area.

Generally, for this project, the cumulative effects study area is limited to the Upper Berryessa Creek corridor and immediately adjacent properties with the following exceptions:

- *Air Quality and Greenhouse Gases*. The greater Milpitas-San Jose airshed.
- *Biological Resources*. Berryessa Creek from the foothills to San Francisco Bay.
- *GHGs*: Global.
- *Traffic and Transportation*. An expanded study area west to east from I-880 to Park Victoria Dr., north to south from E Calaveras Boulevard to Trade Zone Boulevard.
- *Water Resources*. An area inclusive of existing flood-prone areas in the vicinity of the Upper Berryessa Creek project and Berryessa Creek channel downstream of the project area.

Since any adverse effect of the proposed project would be construction-related, the timing of other projects considered in this cumulative analysis is an important consideration. Overlapping construction schedules may result in cumulative adverse effects if the projects are in close proximity and are of such a scale as to cause greater impacts than if constructed sequentially or at very different times.

4.2. PROJECTS CONSIDERED IN CUMULATIVE ANALYSIS

The projects shown in Figure 4.1 and listed in Table 4.1 include past, present, and planned projects in or near Upper Berryessa Creek that have been considered in the cumulative effects analysis.

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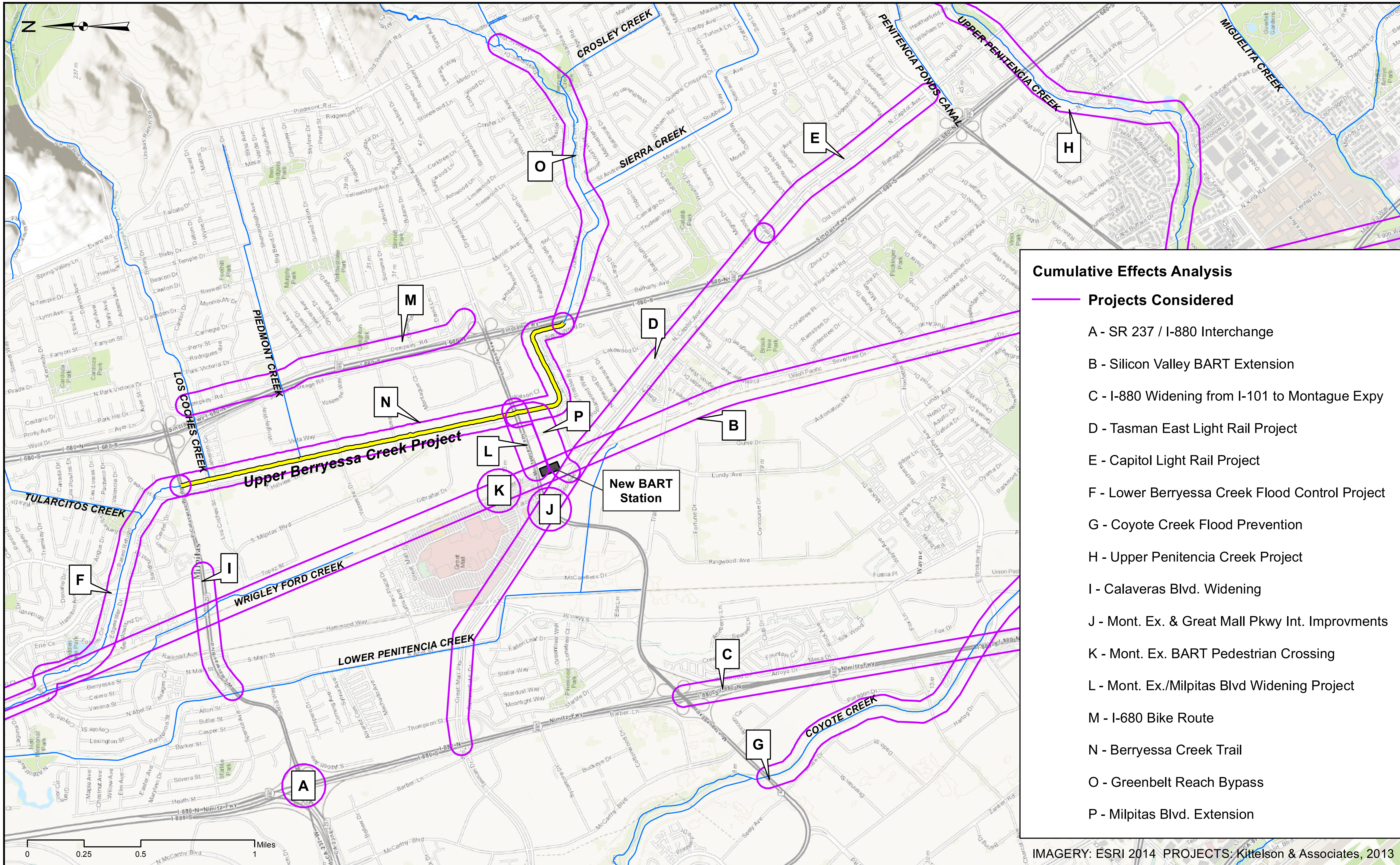

Figure 4.1 Projects Considered in Cumulative Effects Analysis

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Santa Clara Valley Water District

UPPER BERRYESSA CREEK
FLOOD RISK MANAGEMENT PROJECT

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Table 4.1 Past, Present, and Planned Projects in or near Upper Berryessa Creek.			
Projects Considered in Cumulative Analysis	**Location & Distance from Proposed Project**	**Year(s) Completed or Under Construction**	**Potential for Significant Cumulative Effect**
Prior Modifications to Berryessa Creek: Previous work to confine Berryessa Creek flows through industrial, commercial, residential areas (not shown on map)	Co-terminus	Pre-1990	Construction effects are several decades in the past. No potential for cumulative effect. Previous work established current project side-to-side boundaries.
A. Highway 237/I-880 Interchange Reconstruction Project: This transportation project includes two elements: (1) Carpool connectors from southbound I-880 to westbound Route 237 and from eastbound Route 237 to northbound I-880, and (2) a southbound "braided" exit ramp from I-880 to Tasman Dr. (USACE 2014).	One-and-half miles west of the project.	2005	Construction effects are a decade old. Provides carpool incentives for westbound traffic on Calaveras Boulevard. No potential for cumulative effect.
B. Bay Area Rapid Transit (BART) Silicon Valley Extension Project: This project involves the extension of BART to Milpitas, San Jose and Santa Clara. Current construction activities involve the Berryessa extension through Milpitas and into San Jose. Two stations are included in the current work – Montague Expressway/Capitol in Milpitas (sub-surface station) and Berryessa (elevated station) in San Jose (VTA 2015a).	Line is 3000' west of creek at Calaveras; 1000' west at Montague Exp.	Construction work substantially complete in mid-2016. Train testing in 2016-2017, with opening in 2018.	Most of work is occurring in UPRR right-of-way. Calaveras Blvd. passes over tracks. Work affecting traffic on Montague Expressway in vicinity of the Milpitas station is complete, though work in station area will continue until early 2016. Any concurrent construction effects expected to be minor.
C. I-880 Widening from North First Street to Montague Expressway: This highway project widens I-880 between U.S. 101/North First St. and Montague Exp. from a four to a six-lane freeway (USACE 2014).	Intersection of I-880 and Montague Exp. are 1 ½ miles west of the project.	2004	Provided extra freeway lane parallel to project area, providing additional capacity that will benefit the project during lane closures on Calaveras Boulevard (Alt. 2B and 4).
D. Tasman East Light Rail Project: This project consists of a light rail extension from Baypointe Parkway to just south of Hostetter Rd., later extended to Alum Rock. Eleven new light rail stations were added (USACE 2014).	1000' west at Montague Exp.	2004	Provides alternatives to the car for commuters and travelers in San Jose, Milpitas, Mountain View and other south bay communities. Such alternatives could be beneficial to commuters during project construction.
E. Capitol Light Rail Project: This project consists of a light rail extension of the Tasman Light Rail Line, along the Capitol Exp. The Capitol Light Rail adds two new light rail stations (VTA 2015b).	4+ miles south of Montague Exp.	Environmental review completed February 2014. No current timeframe for construction.	Project construction schedule unknown due to lack of funding. Any concurrent construction effects expected to be minor due to distance from project area.

Projects Considered in Cumulative Analysis	Location & Distance from Proposed Project	Year(s) Completed or Under Construction	Potential for Significant Cumulative Effect
F. Lower Berryessa Creek and Lower Calera Creek Flood Protection Improvement Project: The SCVWD proposes to construct a project that will provide protection from the 100-year flood event along Berryessa Creek between Lower Penitencia Creek confluence and Calaveras Blvd. Included in this project are improvements to Calera Creek and Tularcitos Creek, both tributaries to Berryessa Creek (SCVWD 2015a).	Adjacent to north terminus of proposed project.	Environmental review complete in 2012. Construction currently expected 2015-2018.	Construction-related traffic impacts on local roads, plus air quality and noise effects if there is concurrent construction. Potential for temporary adverse effects on aesthetics. Upon completion of the two projects, there would be a cumulative benefit from enhanced flood attenuation.
G. Coyote Creek Flood Protection Project: The SCVWD has completed the first element of this project by constructing flood damage reduction features on lower Coyote Creek from Montague Exp. downstream to the San Francisco Bay. Future phases would involve flood protection improvements south of Montague Expressway to I-280 (SCVWD 2015b).	The northern reach of the project at Montague Exp. is over 2 miles from Upper Berryessa Creek at Montague Exp.	Current schedule unknown	Distance of projects from each other would minimize any adverse cumulative effect if there is concurrent construction.
H. Upper Penitencia Creek Flood Protection Project: The SCVWD is partnering with the U.S. Army Corps of Engineers, San Francisco District, to complete a feasibility study which will identify a plan to improve Upper Penitencia Creek from the confluence with Coyote Creek upstream to Dorel Dr., a length of approximately 4.1 miles, to ensure flood protection from a 100-year event (SCVWD 2015c).	Approximately two miles south of project area.	2021-2024	The projects, upon completion, would provide flood protection benefits to San Jose and downstream cities. Concurrent construction unlikely, as the proposed project is scheduled for completion in 2019.
I. Calaveras Blvd. Widening: The two bridges between Milpitas Blvd and Abel St. would be replaced with a six-lane bridge complete with 10’ sidewalks and 6’ bike lanes. Auxiliary lanes between Abel St. and I-880 together with operational improvements at the Abel St. and Abbott Ave. intersections would be added to insure smooth transitions and continuous bike lanes (USACE 2017).	The eastern end of the project is 2000’ from Upper Berryessa Creek at Calaveras Blvd.	Post-2017	Current schedules show that the proposed project would be complete prior to start of construction of the Calaveras Boulevard widening project. Under this scenario, there would be a longer overall period of traffic disruption (esp. with Alternatives 2B and 4), but at a lesser degree than if there were concurrent construction affecting Calaveras Boulevard. Air quality would also be heightened if there were concurrent construction.

Projects Considered in Cumulative Analysis	Location & Distance from Proposed Project	Year(s) Completed or Under Construction	Potential for Significant Cumulative Effect
J. Montague Expressway and Great Mall Parkway Interchange Improvements: Montague Expressway/Great Mall-Capitol Ave. urban interchange would have a grade separation of the Great Mall-Capitol through lanes over Montague Exp. and would greatly enhance capacity and maintain compatibility with the existing elevated light rail structure and future BART service (USACE 2014).	1000’ west of proposed project.	Post-2017	Assuming project schedules remain separated, no cumulative adverse effects are expected.
K. Montague Expressway/ BART Pedestrian Overcrossing: The project would connect the future Milpitas BART station to the Great Mall of the Bay Area and future Transit-oriented development as highlighted in the City of Milpitas Transit Area Specific Plan (USACE 2014).	1000’ west of the proposed project.	Post-2017	Assuming project schedules remain separated, no cumulative adverse effects are expected.
L. Montague Expressway/Milpitas Blvd Widening Project: The proposed project would widen a 0.6 mile segment of Montague Expressway in the City of Milpitas for the purpose of constructing a fourth lane in each direction (USACE 2014).	Crosses over Upper Berryessa Creek at Montague Exp.	2016-2017	It is likely that bridge work over Upper Berryessa Creek would happen in roughly the same time period as work on the proposed project. If the work were occurring at the same time as work on the Calaveras bridge project under Alts. 2B and 4 traffic impacts would be exacerbated as through lanes on two major east-west arterials would be reduced. The effect would be significant but mitigable.
M. I-680 Bike Route: Class III Bike Route along Dempsey Street, east of I-680 (City of Milpitas, 2009).	1/3 mile east of proposed project	In Milpitas Bike Master Plan	Involves bike route signage on Dempsey Street. No cumulative effects.
N. Berryessa Creek Trail: Class I Bike Path paralleling Upper Berryessa Creek (City of Milpitas, 2009).	Co-terminus with proposed project	In Milpitas Bike Master Plan	Would likely be undertaken sometime after completion of proposed project. Would provide cumulative recreational and non-motorized transportation benefit.
O. Greenbelt Reach Bypass: This bypass is a potential project proposed by the USACE that would convey water around the Greenbelt Reach upstream of I-680 in order to alleviate flooding in the upper watershed (USACE 2014).	Adjacent to south terminal of proposed project.	Post-2017	Upon completion of the two projects, there would be beneficial effects on area flooding. Note that Alts. 2B and 4 are built on the premise of completing the bypass project.

Projects Considered in Cumulative Analysis	Location & Distance from Proposed Project	Year(s) Completed or Under Construction	Potential for Significant Cumulative Effect
P. Milpitas Boulevard Extension: Milpitas Boulevard will be extended at its southern-most end to accommodate the Milpitas BART Transit Station (VTA 2015c).	Adjacent to lower end of Reach 4, on west bank.	2018	Project would likely occur after completion of proposed project. Cumulative impacts associated with proposed project not likely.
SCVWD Stream Maintenance Program 2: Routine stream and canal maintenance activities allowing SCVWD to meet flood control mandates. Includes sediment removal, vegetation management, repair work to levees, and bank protection actions (not shown on map) (SCVWD 2011; SCVWD 2015d).	Adjacent and co-terminus with the proposed project.	2014 - 2023	During construction, maintenance activities in the project area would not be needed. Upon completion, less maintenance work would be needed during the early years due to improved infrastructure.
SCVWD Raw and Treated Water Pipelines Rehabilitation project: Preventive and remedial maintenance activities (not shown on map). Source: 2015 PAWS Report: Programs to Sustain Supply Reliability, Santa Clara Valley Water District (SCVWD 2011; SCVWD 2015d).	In the general project area, especially related to the Milpitas pipeline	On-going	Construction activities are not expected to overlap in geographic proximity.
Residential developments: City of Milpitas has approved development projects for up to 2500 dwelling units. Projects under construction include: Sinclair Renaissance (80 units at 245-371 Sinclair Frontage Road); Robson Single Family (83 units at 905-980 Los Coches St.); Los Coches Residential. Projects with approvals: Milpitas Station (303 units at 1425 S. Milpitas Blvd); 1200 Piper Dr. (732 units); Los Coches Live/Work Residential Project (33 units at Milpitas/Los Coches) (Milpitas Planning Division, 2015). No San Jose development projects are in proximity to the proposed project. (not shown on map) (City of San Jose 2015b).	Generally located near the Montague Exp./Great Mall Pkwy between I-680 and I-880; others located in vicinity of Los Coches St.	2012-2017+	Traffic effects from these approved developments are reflected in the 2017 baseline traffic volumes. Effects as identified by models prepared for this project would be less than significant.
Berryessa Creek Recreational and Transportation Trail	Adjacent to Berryessa Creek in Reaches 1 through 3	Post 2017	Construction of the trail would result in minor air quality, noise, and water quality impacts. Operational impacts would be negligible.

4.3. SIGNIFICANCE CRITERIA

Implementation of the proposed project and other closely related past, present, and reasonably foreseeable probable future projects could result in significant cumulative impacts. This section analyzes whether cumulative impacts would be significant, and for areas with significant cumulative impacts, if the proposed project would make a cumulatively considerable contribution to the significant impact.

4.4. POTENTIAL CUMULATIVE IMPACTS

4.4.1. Aesthetics

The geographic scope of potential cumulative impacts for visual resources includes the project area and immediate vicinity. Cumulative aesthetics impacts could occur if the proposed project and the projects identified in Table 4.1 involved the removal of trees or other actions that would affect the same visual resources, and if impacts to visual resources arising from individual projects were either long-term or their construction schedules overlap with the proposed project. Such projects may include the Calaveras Boulevard widening project, which is located outside of the viewshed of the proposed project, and the Lower Berryessa Creek Program. The implementation of both the proposed project and the Lower Berryessa Creek Program would result in the removal of trees along the creek. The cumulative impact of tree removal would only be apparent where the northern end of the proposed project area meets the southern end of the Lower Berryessa Creek Project. Tree and shrub replacement per USACE commitments would ensure that visual conditions along the creek would be restored upon project completion, and the cumulative impact on aesthetics would be less than significant after mitigation is applied.

4.4.2. Air Quality

The proposed project would have a significant effect on air quality by emitting NOx during construction in excess of BAAQMD thresholds. Implementation of mitigation measures AIR-A and AIR-B would reduce construction–period emissions, but not below the BAAQMD thresholds. Construction activities from multiple, overlapping projects in the same air basin would result in direct, significant effects on air quality mainly related to combustion emissions and dust emissions. Implementation of mitigation measures during construction of any of the projects identified in Table 4.1 would reduce emissions to the extent possible, but emissions of NOx will still exceed BAAQMD thresholds for the proposed project and for several of the other large projects in Table 4.1, resulting in a significant and unavoidable cumulative impact. Construction of the Lower Berryessa Creek Program may overlap with construction of the project. It is expected that effects from these projects would be similar to the proposed project in that effects would be primarily due to construction activities. Therefore, construction of these projects would increase emissions of criteria pollutants, including ROG, NOx, CO, and PM emissions. Both the Lower Berryessa Creek Program and the proposed project would generate emissions of NOx above thresholds and the cumulative impact of these emissions would be significant. The proposed project would make a cumulatively considerable contribution to this significant cumulative impact on air quality. There are no additional feasible mitigation measures to reduce the proposed project’s contribution below cumulatively considerable.

4.4.3. Agriculture and Forestry

There are no agricultural or forestry lands in the project vicinity, therefore there are no impacts from the proposed project or from other nearby past, present, or reasonably foreseeable other projects. Cumulative impacts to agriculture and forestry would be less than significant.

4.4.4. Biological Resources

The proposed project would have a significant impact on riparian vegetation, migratory birds, and trees protected under the City of Milpitas' Tree Ordinance. The geographic scope of potential biological resources encompasses jurisdictional waters of the U.S. and waters of the State, riparian habitat, trees protected under the City of Milpitas Tree Ordinance, and habitats for migratory birds within the project vicinity.

The proposed project would result in less than significant impacts to special status species. Other proposed or ongoing projects in the Berryessa and Coyote Creek watershed, such as the Lower Berryessa Creek Program, the Coyote Creek Flood Protection Project, and the Upper Penitencia Creek Flood Protection Project may disturb or harm special status animal species during project construction. Surveys would be conducted during spring and summer or prior to construction to determine species presence and location of nesting sites. Because some or all of these projects may affect sensitive species or their habitat, they would likely have a significant cumulative impact on special status species. However, there would be no significant adverse impacts to special status species from the proposed project due to the limited biological resources found in the project area. Therefore, the proposed project would not add to cumulative significant impacts to migratory birds or special status species.

The proposed project would remove healthy stands of trees and shrubs. Healthy stands of trees and shrubs may be lost during other construction of other projects occurring along stream corridors, including the Lower Berryessa Creek Program and the Upper Penitencia Creek Flood Protection Project. These cumulative impacts would be significant, and the project's incremental contribution to these impacts would be cumulatively considerable, but it would be reduced to less than cumulatively considerable by implementation of Mitigation Measures BIO-B and BIO-D.

The proposed project would have significant impacts on bird migration due to tree removal, and other projects requiring tree removal would also have these impacts. The Berryessa Creek Recreational and Transportation Trail would increase human use of the creek ROW and increase the potential for human disturbance of birds or vandalism of nests. This cumulative impact would be significant, and the project's incremental contribution to this impact would be cumulatively considerable, but it would be reduced to less than cumulatively considerable by implementation of Mitigation Measures BIO-A and BIO-B.

Trees protected under the City of Milpitas' Tree Protection Ordinance would be removed during construction. Other trees protected under this ordinance may be lost during construction of other projects. This cumulative impact would be significant, and the project's incremental contribution to this impact would be cumulatively considerable, but it would be reduced to less than cumulatively considerable through implementation of Mitigation Measures BIO-B and BIO-D.

The proposed project will not remove jurisdictional wetlands. Some temporary loss of vegetated other waters of the U.S. will occur during construction of both the Lower Berryessa Creek Program and the proposed project. This vegetation will regrow in the same quantity and quality after project construction is complete. The Lower Berryessa Creek program will remove jurisdictional wetlands, but these will be replaced through active planting at 1.2:1 (created: removed) ratio. Other projects that may occur in the

same timeframe are unlikely to affect jurisdictional wetlands or vegetated other waters of the U.S. to a significant degree. Cumulative impacts on jurisdictional wetlands and vegetated other waters of the U.S. would be less than significant.

4.4.5. Cultural Resources

The proposed project would have a significant effect on site CA-SCL-593, which would also represent a cumulatively considerable contribution to significant impacts on known archeological resources in the project area. Implementation of Mitigation Measure CUL-A would reduce the project's impact to less than cumulatively considerable.

During construction, there is the potential for previously unknown archeological sites or human remains to be disturbed. To the extent that other projects in the area disturb additional ground, the overall effect would be an increased chance of uncovering previously unknown sites in the greater area. If these sites contain burial artifacts or human remains, there is the potential for significant, adverse cumulative effects upon cultural resources. Implementation of Mitigation Measure CUL-B would reduce the proposed project's contribution to impacts on unknown archeological sites and human remains to less than cumulatively considerable.

4.4.6. Geology, Soils, and Mineral Resources

The geographic scope of potential cumulative geologic and seismic impacts encompasses the project area and immediate vicinity, including downstream receiving waters where eroded soils may be deposited. Project construction would require significant earthwork activities such as excavation, stockpiling, and transportation of soils and could result in substantial erosion and loss of topsoil, in conjunction with other future projects are in the immediate proximity. The Lower Berryessa Creek Project connects with the proposed project in the vicinity of Calaveras Boulevard. While there is overlap at this location, measures to control erosion and sedimentation will be implemented as written in a Stormwater Pollution Prevention Plan for each project. The Montague Expressway/Milpitas Boulevard Widening Project would overlap the proposed project at Montague Expressway. If constructed at similar times, these projects could lead to loss of topsoil and erosion that would be cumulatively significant, and the proposed project's cumulative contribution to that impact would be cumulatively considerable. Erosion control measures would be implemented to reduce the amount of soil erosion resulting from the proposed project (see Mitigation Measure WAQ-C); therefore, the contribution of the proposed project would not be cumulatively considerable after mitigation.

Also, although the proposed project could expose structures or engineered slopes to adverse effects from seismic ground shaking, this is a highly localized effect that would not contribute to a significant cumulative impact.

4.4.7. Greenhouse Gas Emissions

Past, present, and reasonably foreseeable probable GHG emissions are expected to have a significant impact on worldwide temperatures and will contribute to climate change that will result in significant cumulative effects on the environment. The air quality analysis in this EIR uses the SMAQMD threshold for significant emissions of GHGs, and this threshold already recognizes that GHG emissions impacts are inherently cumulative. GHGs emitted by the project during construction would exceed the significance threshold established by SMAQMD, but would be negligible during operation. It is likely that other

projects of similar size will contribute significant amounts of GHGs in the same construction period as the proposed project. Therefore, the proposed project would result in a cumulatively considerable contribution to GHG impacts.

4.4.8. Hazardous Materials

The geographic scope of cumulative impacts related to hazardous materials includes the project area and areas outside of the project area that may contribute to impacts within the project area via groundwater plume migration. The proposed project is in the vicinity of several known hazardous material sites identified in Section 3.9, but those contaminated sites are being actively remediated, and pollutant levels have been significantly reduced from original levels. Their isolation from other projects identified in Table 4.1 reduces the potential for them to contribute to a significant cumulative impact.

The proposed project would result in significant impacts due to transport and disposal of hazardous materials/wastes and creating the potential for upset or accident exposing persons to hazardous/materials/wastes. These project impacts would be reduced to less than significant through implementation of mitigation measures HWM-A, HWM-B, HWM-C, and WAQ-C. The other projects listed in Table 4.1 would also routinely transport hazardous materials/wastes to and from the project area during construction. The SMP2, the Milpitas Boulevard Extension, and the Montague Expressway/Milpitas Boulevard Widening Project are the only projects listed in Table 4.1 that overlap with the footprint of the proposed project. The SMP2 is a District program and already incorporates District BMPs to minimize the potential for releases of hazardous materials. The Milpitas Boulevard Extension Project and the Montague Expressway/Milpitas Boulevard Widening Project would incorporate standard mitigation measures to minimize impacts related to accidental release of hazardous materials similar to those that would be implemented for the proposed project. These projects would not prevent the ongoing cleanup of contaminated sites in the area. Impacts expected to result from the proposed project and closely related past, present, or reasonably foreseeable probable future projects would not be significant.

4.4.9. Land Use and Planning

The geographic scope of potential cumulative land use impacts encompasses the project area and immediate vicinity, including proposed staging areas and detour routes. Past, present, and reasonably foreseeable projects in the vicinity would result in a densification of residential uses and increased transportation infrastructure in the form of new BART Service, increased capacity on roadways, and a new trail for pedestrian and non-motorized transport uses along the creek. These changes would be in conformance with the City of Milpitas and City of San Jose Master Plans. Cumulative land use impacts would not be significant because future development would likely not divide established communities, or conflict with land use plans and policies or HCPs. Therefore, although the project before mitigation would conflict with the City of Milpitas Trails Master Plan, this conflict would not represent a cumulatively considerable contribution to a significant land use impact.~~Due to the relatively large amount of development in the area, land uses changes expected to result from the proposed project and nearby past, present, or reasonably foreseeable probable future projects would be significant. The proposed project would not directly or indirectly change types or intensities of land uses; the proposed project would not make a cumulatively considerable contribution to this significant impact.~~

4.4.10. Noise

The proposed project would have a significant effect by generating construction noise outside of allowable construction windows set by the City of Milpitas. Mitigation Measures NOI-A, NOI-B, and NOI-C would reduce construction noise impacts, but noise occurring outside of the construction window of 7:00 am to 7:00 pm would constitute a significant and unavoidable impact.

Cumulative noise impacts would result from simultaneous construction activities in proximate location to one another. The only projects from Table 4.1 that are physically overlapping are the Milpitas Boulevard Extension Project, the Montague Expressway/Milpitas Boulevard Widening Project and SMP2. The Calaveras Boulevard project may occur at the same time as the proposed project, but is located approximately 2,000 feet from the project area, so noise impacts from the two projects would remain isolated. The noise-producing activities of SMP2 would not occur during construction of the proposed project. Although there is the potential for overlap between the Montague Expressway/Milpitas Boulevard Widening Project and the proposed project, there are no sensitive receptors in the immediate vicinity of the creek at Montague Expressway. Nevertheless, because other projects could contribute to the proposed project's temporary noise impacts, cumulative noise impacts would be significant, the proposed project's contribution would be cumulatively considerable, and feasible mitigation measures are not available to reduce the proposed project's contribution to less than cumulatively considerable.

4.4.11. Population and Housing

Several of the projects identified in Table 4.1 would be growth-inducing, including the residential developments in the City of Milpitas, the BART Silicon Valley Extension Project, and the various street widening and improvement projects. These projects would create a significant impact on population and housing. The proposed project would not contribute to increases in population or the need for additional housing, and is not growth-inducing, so there would be no significant population and housing impact.

4.4.12. Public Services

It is considered unlikely that multiple, concurrent events would occur that would overwhelm the capacity of emergency service providers as a result of the construction projects identified in Table 4.1. If construction workers move families to the project areas during the construction periods, impacts to schools and parks would be dispersed and would not be cumulatively significant. Cumulative impacts expected to result from the proposed project and closely related past, present, or reasonably foreseeable probable future projects would be less than significant.

4.4.13. Recreation

Upper Berryessa Creek within the project boundaries has relatively little recreational use. The existing exercise equipment and 460 linear feet of recreational trail near the confluence of Berryessa and Los Coches creeks would be removed by the proposed project; however these small recreational features receive minimal use and their removal would not result in significant impacts to recreational opportunities. During construction of the proposed project, existing unauthorized public access to the creek ROW would be temporarily limited. Similar restrictions would be in place during construction of the Lower Berryessa Creek Program. The local population would have access to other bicycle and walking trails and public recreational facilities in the area during construction periods of the two projects. After construction of the project is completed, the existing public recreational trail along Lower Berryessa Creek would be re-opened for public use. The proposed project would accommodate a recreational trail along Upper Berryessa Creek planned by the City of Milpitas. If that trail is built,

recreational opportunities along the creek would be increased compared to the existing condition. Cumulative impacts to recreation expected to result from the proposed project and closely related past, present, or reasonably foreseeable probable future projects would be less than significant.

4.4.14. Traffic and Transportation

The proposed project would generate significant effects by conflicting with plans design to promote transportation efficiency, increasing hazards to other road users, impeding emergency access, and conflicting with performance of public transportation and alternative transportation modes. Implementing Mitigation Measures TRA-A and HWM-B would reduce these impacts to less than significant. Under current project schedules, construction of the proposed project may coincide with construction of the Montague Expressway/Milpitas Boulevard Widening Project and the Calaveras Boulevard Widening Project. The proposed project lane would temporarily close traffic lanes on Ames Avenue, Yosemite Drive, and Los Coches Street for up to 10 days. Because Montague Expressway traffic may divert to Ames Avenue or Yosemite Drive to avoid traffic slowdowns, significant traffic delays could occur at these intersections. Additionally, trucks entering Montague Expressway from Reach 4 access roads will contribute to traffic volumes and slowdowns if they do so during construction of the Montague Expressway/Milpitas Boulevard Widening Project. Trucks entering Calaveras Boulevard could contribute to slowdowns in addition to those that may occur as a result of the Calaveras Boulevard Widening Project. Collectively, these traffic slowdowns could affect transit schedules, increase commute times, and increase emergency response times, constituting significant cumulative transportation impacts. The proposed project's contribution to these impacts would be cumulatively considerable.

Mitigation Measure TRA-A would require preparation and implementation of a Traffic Control and Traffic Management Plan in coordination with local traffic agencies, emergency responders, transit agencies, and other stakeholders. The proponents/sponsors of the other projects mentioned above will create similar traffic management plans. Those plans would be coordinated to reduce impacts to traffic and transportation. Therefore, after implementation of mitigation, the proposed project would not result in a cumulatively considerable contribution to this significant impact.

4.4.15. Utilities and Service Systems

The proposed project would result in a significant impact by encountering contaminated groundwater from the JCI offsite plume area and disposing of that untreated contaminated groundwater, which would exceed wastewater treatment requirements of the SFBRWQCB. Measures WAQ-B and HWM-C would be implemented to reduce this impact to less than significant. The other projects listed in Table 4.1 would not be expected to encounter contaminated groundwater with the exception of the Milpitas Boulevard/Montague Expressway Widening Project, which may require relatively deep excavations to replace the Montague Expressway Bridge crossing Berryessa Creek. The sponsors of that project will prepare a Site Management Plan and a Health and Safety Plan to specify methods for handling and disposing of contaminated groundwater encountered during construction consistent with water quality standards (County of Santa Clara Roads and Airports Department. March 2013). The cumulative impact of handling and disposing of contaminated water from the JCI plume would be significant before mitigation, and the proposed project's contribution to this impact would be cumulatively considerable. However, after implementation of Mitigation Measure HWM-C, the proposed project's contribution to this impact would be less than cumulatively considerable.

The schedule for construction of the Calaveras Boulevard Widening Project and the Montague Expressway/Milpitas Boulevard Widening Project overlap with the proposed project. Both of these projects would include excavation and removal of construction debris that would be deposited at local landfill facilities, but since those projects are confined to a smaller footprint and will require less excavation, disposal quantities will be less than under the proposed project. Additionally, approximately 156,000 cubic yards of material could be deposited in landfills as a result of construction of the Lower Berryessa Creek Program, which would be constructed prior to and concurrently with the proposed project.

Analysis of potential effects on landfill capacity in Section 3.16.6 indicated that most disposal facilities in the project vicinity have sufficient capacity to accept the debris from the proposed project without losing significant amounts of their remaining capacity. Disposal of up to 90,000 cubic yards of material, as is predicted under the worst-case scenario for the proposed project, would use between 0.2 and 1.2 of the remaining capacity at five of the seven landfills identified in Table 3.41. At the other two landfills, between 13 and 20 percent of the capacity would be used. Assuming that the projects mentioned above, including the proposed project, collectively sent up to 400,000 cubic yards of materials to any of the five sites with high remaining capacity, the worst case would be a reduction of approximately 5 percent of remaining capacity at the site with the least capacity, which is the Vasco Road Sanitary Landfill. The cumulative impact on waste generation and disposal from closely related past, present, or reasonably foreseeable probable future projects would be less than significant.

4.4.16. Hydrology and Water Quality

The geographic scope of potential cumulative hydrology and water quality impacts generally encompasses the Berryessa Creek watershed, which includes the following water bodies: Lower Berryessa Creek, Upper and Lower Calera Creek, Tularcitos Creek, and Lower Penitencia Creek and the underlying Santa Clara sub-basin groundwater.

The Lower Berryessa Creek Program has the most potential to cause cumulatively significant impacts to water quality in combination with the proposed project. Both of these projects have the potential to degrade surface water quality as a result of construction-related soil erosion and accidental discharges of hazardous materials into downstream water bodies within the project vicinity. The sponsors of the proposed project would implement Mitigation Measures HWM-A, HWM-C, WAQ-A, WAQ-B and WAQ-C to reduce the proposed project's water quality impacts to less than significant. The sponsor of the Lower Berryessa Creek Program would implement similar measures to prevent adverse water quality impacts during construction. Also, both projects would obtain and implement Construction General Permits, which include requirements for creating Stormwater Pollution Prevention Plans. Therefore, the cumulative impact to water quality from these two projects would be significant and the proposed project's contribution to this impact would be cumulatively considerable before mitigation. However,~~But~~ after implementation of mitigation measures the proposed project's contribution would be less than cumulatively considerable.

All projects listed in Table 4.1 have low potential to affect groundwater quality and recharge, since they are not designed to increased consumptive use of groundwater and are not expected to decrease groundwater recharge capacity. Cumulative impacts to groundwater quality and recharge from closely related past, present, or reasonably foreseeable probable future projects would be less than significant.
The proposed project would result in altered drainage patterns in the long-term and could potentially result in downstream erosion or siltation depending on the change in flow velocity and subsequent increase in capacity of the channel to erode and mobilize bed and bank sediments. Of the cumulative

projects considered in this analysis, the BART Berryessa Extension Project and the Lower Berryessa Creek Program could also have a potential to alter drainage patterns and cause subsequent erosion or siltation in the project area. Closely related past, present, or reasonably foreseeable probable future projects would not significantly change the locations of drainages, and would increase their flow conveyance and sediment transport capacities. They would not substantially change the largely depositional nature of the channel reaches within the project area. Cumulative impacts to drainage, erosion, and siltation from closely related past, present, or reasonably foreseeable probable future projects would be less than significant.

Under existing conditions, the 100-year flow causes flooding throughout the project area. Implementation of the proposed project would reduce flooding immediately upstream and downstream of the project area. This will result in increased flows to Lower Berryessa Creek downstream of the project area during high flow events. Construction of the Lower Berryessa Creek Program is underway and will increase the flow conveyance capacity of Lower Berryessa Creek so that it can convey the increased flows from Upper Berryessa Creek without increased flood hazards. Cumulative impacts to hydrology expected to result from the proposed project and closely related past, present, or reasonably foreseeable probable future projects would be less than significant.

5. ALTERNATIVES ANALYSIS

5.1. INTRODUCTION

~~The California Environmental Quality Act (~~CEQA~~)~~ Guidelines Section 15126.6(a) states that an ~~environmental impact report (~~EIR~~)~~ must describe and evaluate a reasonable range of alternatives that would feasibly attain most of the project's basic objectives, but that would avoid or substantially lessen any identified significant adverse environmental effects of the project. An EIR is not required to consider every conceivable alternative to a proposed project. Rather, it must consider a reasonable range of potentially feasible alternatives that will foster informed decision-making and public participation.

CEQA Guidelines Section 15126.6(e) states that, "The specific alternative of 'no project' shall also be evaluated along with its impact." The EIR must evaluate the comparative merits of the alternatives and include sufficient information about each alternative to allow meaningful evaluation, analysis. Specifically, the CEQA Guidelines set forth the following criteria for selecting and evaluating alternatives:

- The discussion of alternatives should focus on alternatives to the project or its location that are capable of avoiding or substantially lessening any significant effects of the project, even if these alternatives would impede to some degree the attainment of the project objectives or would be more costly (CEQA Guidelines §15126.6[b]).
- The range of potential alternatives should include those that could feasibly accomplish most of the basic objectives of the project and could avoid or substantially lessen one or more of the significant effects (CEQA Guidelines §15126.6[c]).
- The specific alternative of "No Project" (referred to as the No Project Alternative) should also be evaluated along with its impact (CEQA Guidelines §15126.6[e][1]).
- The alternatives should be limited to ones that would avoid or substantially lessen any of the significant effects of the project. Of those alternatives, the EIR need examine in detail only the ones that the lead agency determines could feasibly attain most of the basic objectives of the project. The range of feasible alternatives should be selected and discussed so as to foster meaningful public participation and informed decision making (CEQA Guidelines §15126.6[f]).

5.2. ALTERNATIVES DEVELOPMENT

5.2.1. Alternatives Identification and Screening

The USACE developed alternatives for the proposed project with the assistance of the District as the local partner. In developing the alternatives, USACE applied federal planning criteria which require that the project contribute to National Economic Development (NED) and National Ecosystem Restoration. The specific planning objectives for the project are:

Objective 1: *Reduce flood damages from Berryessa Creek upstream of Calaveras Boulevard throughout the study reach, during the 50-year period of analysis beginning in 2017. Completed project would meet FEMA certification standards in all 4 project reaches.*

Objective 2: *Use environmentally sustainable design practices in addressing the flood risk management purpose of the project wherever possible within the study reach, including taking*

advantage of restoration opportunities that may be pursued incidental to the flood damage reduction purpose.

Objective 3: *Be consistent with the Berryessa Creek Flood Risk Management Project Plan selected by USACE in the Director's Report of May 29, 2014.*

During development and evaluation of alternatives, USACE and the District also considered the following planning considerations:

- Use the District's Natural Flood Protection (NFP) objectives when evaluating the alternatives and selecting the locally preferred project alternative.
- Coordinate closely with affected cities on their recreational projects to avoid design conflicts to the extent practical, and provide opportunities for cities to incorporate recreational features into the project.
- Reduce maintenance requirements especially due to sedimentation.
- Improve water quality by reducing sedimentation within the creek.
- Cooperate with the mutually beneficial goals of related plans, projects, and agencies.
- Fully coordinate with other Federal, State, local agencies, and stakeholders.

In 1987, USACE prepared the Interim Feasibility Report and Environmental Impact Statement for Coyote and Berryessa Creeks (USACE, 1987), which evaluated a number of non-structural and structural alternatives to provide flood protection for the Upper Berryessa Creek area. Table 5.1 lists the alternatives considered and the findings of the 1987 report:

Table 5.1 Consideration of Alternatives in 1987 USACE Interim Feasibility Report

Alternative	Evaluation
Non-Structural	
Flood Insurance	Implemented in project area
Flood Forecast, Warning, Evacuation	Infeasible due to rapid rise time of Berryessa Creek
Floodproofing	Not cost effective, benefit-cost ratio is 0.2
Remove existing structures from floodplain	Would require removal of 655 residential and commercial structures, which would be economically infeasible and socially unacceptable
Protect movable, damageable property	Not effective due to rapid rise time of Berryessa Creek
Channel Modifications	
Rectangular concrete channel (RCC)	Carried forward for analysis
RCC with articulated concrete mats	Rejected because flow velocities would exceed the design velocities of the mats
Trapezoidal concrete channel and slope protection	Carried forward for analysis
Trapezoidal concrete channel	Carried forward for analysis

Congress passed the Water Resources Development Act (WRDA) of 1990 which authorized the Berryessa Creek Flood Control Project. The authorized design extended from 600 ft. upstream of Old Piedmont Road to 50 ft downstream of Calaveras Boulevard. The project authorized in the WRDA of 1990 had a length of 4.5 miles (i.e. about double the length of the proposed project analyzed in this EIR). The 1990 authorized project consisted of a trapezoidal concrete channel, two debris basins, and levees along portions of the channel (USACE, 2014). The authorized project

would prevent overtopping of banks during the 1% annual chance of exceedance (ACE) event. At that time, risk and uncertainty concepts were not applied to the project.

In 2013 and 2014, USACE performed a re-evaluation of the 1990 authorized project to determine the project design that would best meet NED objectives (USACE, 2014). They screened four potential non-structural management measures, 13 structural management measures, 15 habitat management measures, and 9 recreation and public access management measures to determine their effectiveness in meeting the project objectives and potential environmental, economic, and social effects. The screening criteria for the management measures were:

- Reduce flood damages
- Provide ecological functions/environmental values
- Provide natural physical stream functions and processes
- Avoid and minimize effects to riparian and aquatic habitat
- Minimize O&M especially due to sedimentation
- Integrate watershed processes
- Provide access and recreation to the public
- Cooperate with mutually beneficial goals of related plan, projects, and agencies
- Maximize community benefits beyond flood protection
- Minimize life cycle costs
- Assumed community acceptability
- Property availability/rights of way
- Implementation cost

The re-evaluation also applied risk and uncertainty concepts to analyze two levels of flood protection performance: Moderate Performance, defined as 50% conditional non-exceedance probability (CNP) for the ACE flood event; and National Flood Insurance Program (NFIP) performance, which has a 95 percent CNP for the 1 percent flood event (USACE 2014). USACE, working with the District, formulated an array of project alternatives that would be consistent with the project authorized by Congress and include those management measures found to be most effective at meeting the project objectives. The No Action alternative was also carried forward for comparison purposes. Table 5.2 summarizes the initial array of alternatives.

Table 5.2 Initial Array of Project Alternatives

Alternative	Description	Level of Performance
1	No Action	n/a
2A	Incised Trapezoidal Channel	Moderate
2B	Incised Trapezoidal Channel	NFIP
3A	Terraced Trapezoidal Channel	Moderate
3B	Terraced Trapezoidal Channel	NFIP
4A	Walled Trapezoidal Channel	Moderate
4B	Walled Trapezoidal Channel	NFIP
5	Authorized Project	Moderate

USACE analyzed the costs to implement each of the project alternatives listed in Table 5.2. The cost of implementing Alternatives 3A or 4A would be more than double the cost of implementing Alternative 2A and would provide no additional benefits; therefore project alternatives 3A and 4A were eliminated from further consideration. Alternative 3B would provide no additional

environmental or economic benefits beyond Alternative 4B, so it was also eliminated from further consideration. Alternative 4B was retained but was renamed Alternative 4 since 4A had been eliminated.

The cost analysis also found that providing flood protection for the area upstream of Interstate 680 would have Benefit-Cost Ratio (BCR) well below 1 (i.e. the costs would exceed the benefits). In contrast, the portion of the project downstream of I-680 would have a BCR greater than 1 (i.e. benefits would exceed costs). Therefore, the project sponsors decided to limit the project improvements to the area downstream of I-680. To signify this change, the symbol "/d" was added to each alternative's designation (USACE, 2014). The final array of alternatives considered in the USACE GRR and EIS is presented in Table 5.3.

Table 5.3 Final Array of Project Alternatives

Alternative	Description	Level of Performance
1	No Action	n/a
2A/d	Incised Trapezoidal Channel	Moderate
2B/d	Incised Trapezoidal Channel	NFIP
4/d	Walled Trapezoidal Channel	NFIP
5	Authorized Project	n/a

Alternatives 2B/d and 4/d assume that a bypass structure would be built upstream of I-680 and that the existing bridges crossing Berryessa Creek at Los Coches Street and Calaveras Boulevard would be replaced with new 100-ft spans. Alternative 2A/d does not include these elements. Alternatives 2B/d and 4/d also include replacement of the Montague Expressway Bridge crossing Berryessa Creek with a new 70-ft span (USACE, 2014). Santa Clara County Roads and Airports Department is currently replacing that bridge and a new bridge with sufficient capacity for the 1% ACE flow will be in place prior to the expected completion date of the proposed project (County of Santa Clara, 2013). Therefore, this element is no longer included in any of the project alternatives evaluated in this report. The USACE-selected plan is Alternative 2A/d. USACE completed the Final GRR/EIS in March 2014. In May 2014, USACE Director of Civil Works approved the NEPA Record of Decision (ROD) and issued the Director's Report for the selected plan (i.e. Alternative 2A/d). The ROD states:

> The recommended plan is considered the environmentally preferred alternative. The recommended plan avoids or minimizes impacts to environmental resources to a greater extent than do the other alternatives, mainly due to a shorter construction period, while meeting the flood risk management purpose, although there would still be temporary disturbance of habitats and air quality in the construction area. Adverse environmental effects will be reduced to a less than significant level through project design, construction practices, preconstruction surveys and analysis, regulatory requirements and best management practices. All practicable means to avoid, minimize, and mitigate adverse environmental impacts were included in the plan formulation process and have been incorporated into the selected plan. Although the selected plan would not result in any long-term significant impacts, there would be short-term effects to air quality, water quality, wildlife, cultural resources, transportation and noise.
>
> Mitigation measures pertaining to the selected plan and included within the assessment of effects in the final GRR/EIS are adopted in this Record of Decision (ROD) as environmental commitments that will be implemented by the Corps. Monitoring plans

included as the assessments in the final GRR/EIS are also adopted in this ROD to ensure that impacts described in the final GRR/EIS are not exceeded and mitigation features function as intended.

Technical and economic criteria used in the formulation of alternative plans were those specified in the Water Resources Council's Economic and Environmental Principles and Guidelines for Water and Related Land Resource Implementation Studies. All applicable laws, executive orders, regulations, and guidelines were considered in the evaluation of alternatives and the selection of the recommended plan. Based on review of these evaluations, I find that the flood risk management and recreation benefits gained by construction of the recommended plan serve the public interest and outweigh any adverse effects. This ROD completes the National Environmental Policy Act process.

Additional hydraulic analysis of Alternative 2A/d found that the level of performance could be increased to meet NFIP requirements by increasing the height and length of the floodwalls located near the Piedmont Creek confluence and upstream of Montague Expressway (USACE 2014). The District found that those modifications would provide considerable benefit to the local community by removing a large number of parcels from the designated flood hazard area designated by FEMA (USACE 2014). The District seeks to capture that benefit by using District funds to pay for the increased cost of taller and longer floodwalls at these two locations. Thus, the proposed project analyzed in this EIR is the USACE-selected Alternative 2A/d with larger floodwalls to meet the NFIP level of performance.

5.2.2. Alternatives Evaluated in EIR

In accordance with CEQA Guidelines § 51526.6(a), several alternatives to the proposed project have been developed and analyzed in this EIR. Alternatives are numbered as 2A, 2B and 4 to provide consistency with the numbering scheme in the corresponding General Reevaluation Report/Environmental Impact Statement (GRR/EIS) prepared by the U.S. Army Corps of Engineers (USACE 2014). This EIR analyzes the proposed project and project alternatives included in the Final Array of Project Alternatives contained in the USACE GRR/EIS, with the exception of the authorized project from the 1990 WRDA, which has been updated and replaced by the current USACE-selected alternative of 2A/d. Because all of the alternatives are located downstream of I-680, the designator "/d" has been dropped in this EIR.

In accordance with CEQA Guidelines § 51526.6(a), four alternatives to the proposed project have been developed and evaluated in this ~~D~~EIR. They are intended to provide a range of alternative actions that could feasibly achieve the project objectives while reducing the proposed project's significant adverse impacts. The alternatives are as follows;

- **No Project Alternative**,
- **Alternative 2A**: USACE-Selected Project,
- **Alternative 2B**: Expanded Incised Trapezoidal Channel (FEMA Certification Performance)
- **Alternative 4**: Walled Trapezoidal Channel (FEMA Certification performance)

Brief descriptions of the alternatives are given below. Sections 5.2.3.1 through 5.2.3.4 describe the No Project Alternative as well as features of the action alternatives. Table 5.4, below, summarizes project features under each build alternative, and since the alternatives share numerous construction components with the proposed project, project features for the proposed project are

also described. No impacts to Agriculture or Forestry Resources were identified, therefore that category is not discussed further in this document.

Most project features are designed to increase the level of flood protection offered to the surrounding homes, businesses, and infrastructure. Non-structural features have been included in the interest of restoring and enhancing ecosystem functions. These features include installation of riparian terraces and revegetation of the floodplain with native riparian and wetland species.

Potential impacts occurring under each alternative are assessed in this chapter. To facilitate comparison of the alternatives, Table 5.5 provides a summary of the effects under each of the alternatives, the level of significance of impacts, and mitigation that would either reduce the significance of impacts to less than significant or further reduce impacts that already are less than significant. Table 5.6 shows the construction quantities associated with each alternative.

<table>
<tr><th colspan="5">Table 5.4 Summary of Project Alternative Features</th></tr>
<tr><th>Project Feature</th><th>Proposed Project, Widened Trapezoidal Channel (FEMA Certification Performance)</th><th>Alternative 2A
USACE-Selected Alternative</th><th>Alternative 2B
Expanded Incised Trapezoidal Channel (FEMA Certification Performance), Accommodate Upstream Bypass Channel</th><th>Alternative 4
Walled Trapezoidal Channel (FEMA Certification Performance)</th></tr>
<tr><td>I-680 Bridge to 900 ft downstream of I-680 bridge</td><td colspan="4">Remove accumulated sediment at downstream face.</td></tr>
<tr><td>Channel from 900 ft downstream of I-680 to Montague Expressway</td><td colspan="2">Excavate 9- to 12-foot deep, 16-foot bottom width earthen channel with buried rock revetment and turf reinforcement mats at 2H:1V sideslope. 450-ft long buried concrete floodwall upstream of Montague Expressway.</td><td>Excavate 6- to 22-foot bottom width earthen channel with cellular bank stabilization at 2H:1V sideslope and access road along left bank slope; construct free-standing concrete floodwall to maximum height of 4 feet.</td><td>Excavate 10-foot earthen channel with 10 and 22-foot vegetated terraces and vertical concrete walls extending a maximum of 3 feet above existing ground.</td></tr>
<tr><td>Channel from Montague Expressway to UPRR Trestle</td><td colspan="2">Excavate 10.5 foot deep, 12-foot bottom width earthen channel with buried rock revetment and turf reinforcement mats at 2H:1V sideslope</td><td>Excavate 14-foot bottom width earthen channel with cellular bank stabilization at 2H:1V sideslope; construct free-standing concrete floodwall to maximum height of 2 feet.</td><td>Excavate 10-foot earthen channel with 10 and 22-foot vegetated terraces and vertical concrete walls extending a maximum of 3 feet above existing ground.</td></tr>
<tr><td>UPRR Railroad Trestle Bridge</td><td colspan="4">Remove existing timber trestle; construct double-barreled concrete box culvert with warped wingwall transition structure.</td></tr>
<tr><td>Channel from UPRR Trestle to UPRR Culvert</td><td colspan="2">Excavate 10.5 foot deep, 12-foot bottom width earthen channel with buried rock revetment and turf reinforcement mats at 2H:1V sideslope</td><td>Excavate 10 to 12-foot bottom width earthen channel with cellular bank stabilization at 2H:1V sideslope and access road along left bank slope</td><td>Excavate 10-foot earthen channel with 10- and 32-foot vegetated terraces and vertical concrete walls extending to existing ground</td></tr>
<tr><td>UPRR Railroad Culvert</td><td colspan="2">Not Included</td><td colspan="2">Remove existing triple box culvert; construct 60-foot span 12-foot rise bridge</td></tr>
<tr><td>Channel from UPRR Culvert to Ames Ave.</td><td colspan="2">Excavate 11-foot deep, 12-foot bottom width earthen channel with buried rock revetment and turf reinforcement mats at 2H:1V sideslope</td><td>Excavate 17-foot bottom width earthen channel with cellular bank stabilization at 2H:1V sideslope and access road along left bank slope</td><td>Excavate 10-foot earthen channel with 10- and 32-foot vegetated terraces and vertical concrete walls extending to existing ground</td></tr>
<tr><td>Ames Ave. Bridge</td><td colspan="2">Excavate 12-foot bottom width channel beneath bridge; construct abutment and pier protection and wingwall transition structure</td><td colspan="2">Excavate 17-foot bottom width channel beneath bridge; construct abutment and pier protection</td></tr>
<tr><td>Channel from Ames Ave. to Yosemite Dr.</td><td colspan="2">Excavate 9.5 feet deep, 12-foot bottom width earthen channel with buried rock revetment and turf reinforcement mats at 2H:1V sideslope</td><td>Excavate 24-foot bottom width earthen channel with cellular bank stabilization at 2H:1V sideslope and access road along left bank slope</td><td>Excavate 10-foot earthen channel with 10- and 32-foot vegetated terraces; construct concrete floodwall to extend maximum of 6</td></tr>
</table>

Table 5.4 Summary of Project Alternative Features				
Project Feature	**Proposed Project, Widened Trapezoidal Channel (FEMA Certification Performance)**	**Alternative 2A USACE-Selected Alternative**	**Alternative 2B Expanded Incised Trapezoidal Channel (FEMA Certification Performance), Accommodate Upstream Bypass Channel**	**Alternative 4 Walled Trapezoidal Channel (FEMA Certification Performance)**
				feet above existing ground
Yosemite Dr. Bridge	Excavate 20-foot bottom width channel beneath bridge; construct abutment and pier protection; no transition structure		Excavate 38-foot bottom width earthen channel beneath bridge; construct abutment and pier protection	Excavate channel and construct walls beneath bridge; construct abutment and pier protection
Channel from Yosemite Dr. to Los Coches St.	Excavate 9-14 foot deep, 20-40-foot bottom width earthen channel with buried rock revetment and turf reinforcement mats at 2H:1V sideslope; access road along left bank slope; construct 2,200 foot floodwall with maximum height of 2 feet. Remove existing timber UPRR trestle and install concrete culvert crossing Piedmont Creek for access road and UPRR spur track, and additional culvert at mouth of Los Coches Creek. Remove exercise equipment upstream of Los Coches Street.	Same as proposed project except Reaches 2/3 floodwall would be approximately 1,300 feet long and 1.5 ft high.	Excavate 38-foot bottom width earthen channel with cellular bank stabilization at 2H:1V sideslope and access road along left bank slope; construct free-standing concrete floodwall to maximum height of 5 feet	Excavate 10-foot earthen channel with 10- and 32-foot vegetated terraces; construct concrete floodwall to extend maximum of 6 feet above existing ground
Los Coches St. Bridge	Construct transition to existing structure		Remove existing bridge; construct 100-foot span bridge with raised deck and 4-foot high solid bridge face	
Channel Reach from Los Coches St. to Calaveras Blvd.	Excavate 12-14 foot deep, 40-foot bottom width earthen channel with buried rock revetment and turf reinforcement mats at 2H:1V sideslope; access road along left bank slope. Remove pocket park and exercise equipment.		Excavate 38-foot bottom width earthen channel with cellular bank stabilization at 2H:1V sideslope and access road along left bank slope; construct free-standing concrete floodwall to maximum height of 5 feet. Remove pocket park and exercise equipment.	Excavate 10-foot earthen channel with 10- and 32-foot vegetated terraces; construct concrete floodwall to extend maximum of 6 feet above existing ground. Remove pocket park and exercise equipment.
Calaveras Blvd. Bridge Transition at Upstream Face	Construct transition to existing structure		Remove existing box culvert; construct 100-foot span bridge with raised deck	
Channel Reach Downstream of Calaveras Boulevard	No change		Construct transition to downstream project	

Table 5.5 Summary of Significant Effects, Mitigation Measures, and Level of Significance by Alternative					
ENVIRONMENTAL RESOURCE	**PROPOSED PROJECT** Widened Trapezoidal Channel (FEMA Certification Performance)	**NO PROJECT ALTERNATIVE**	**ALTERNATIVE 2A** USACE-Selected Alternative	**ALTERNATIVE 2B** Expanded Incised Trapezoidal Channel (FEMA Certification Performance), Accommodate Upstream Bypass Channel	**ALTERNATIVE 4** Walled Trapezoidal Channel (FEMA Certification Performance)
KEY: (+) Impacts greater than for Proposed Project, **(=)** Impacts equal to Proposed Project, **(-)** Impacts less than for Proposed Project, **(NI)** No Impact, **(LS)** Less than Significant Impact, **(LM)** Less than Significant Impact with Mitigation, **(S)** Significant Impact, **(SU)** Significant and Unavoidable Impact * Although impacts associated with these resource types were determined to be less than significant, a mitigation measure is proposed, or a measure proposed to address another significant impact would further reduce this already LTS impact.					
Aesthetics	No significant impacts	**(-)** No significant impacts	No significant impacts	No significant impacts	No significant impacts
BIO-B: Compensate for Trees Removed During Construction*	✓		✓	✓	✓
Significance Determination Before Mitigation/After Mitigation	LS	NI	LS	LS	LS
Air Quality	NOx emissions above BAAQMD thresholds (AIR-2 and AIR-3)	**(-)** No significant impacts	**(=)** NOx emissions above BAAQMD thresholds (AIR-2 and AIR-3)	**(+)** NOx emissions above BAAQMD thresholds (AIR-2 and AIR-3)	**(+)** NOx emissions above BAAQMD thresholds (AIR-2 and AIR-3)
AIR-A. Reduce Construction Period Dust Emissions	✓		✓	✓	✓
AIR-B. Reduce Construction Equipment Emissions	✓		✓	✓	✓
Significance Determination Before Mitigation / After Mitigation	S / SU	NI	S / SU	S / SU	S / SU
Agriculture and Forestry	None	None	None	None	None
Significance (No Mitigation)	NI	NI	NI	NI	NI
Biological Resources	Adverse impacts on riparian habitat and healthy trees/shrubs (BIO-2).Adverse impacts on bird migration (Impact BIO-4). Conflict with policies in Milpitas Tree Ordinance (BIO-5)	**(-)** No significant impacts	**(=)** Adverse impacts on riparian habitat and healthy trees/shrubs (BIO-2). Adverse impacts on bird migration (Impact BIO-4). Conflict with policies in Milpitas Tree Ordinance (BIO-5)	**(+)** Adverse impacts on riparian habitat and healthy trees/shrubs (BIO-2). Adverse impacts on bird migration (Impact BIO-4). Conflict with policies in Milpitas Tree Ordinance (BIO-5)	**(+)** Adverse impacts on riparian habitat and healthy trees/shrubs (BIO-2). Adverse impacts on bird migration (Impact BIO-4). Conflict with policies in Milpitas Tree Ordinance (BIO-5)

ENVIRONMENTAL RESOURCE	**PROPOSED PROJECT** Widened Trapezoidal Channel (FEMA Certification Performance)	**NO PROJECT ALTERNATIVE**	**ALTERNATIVE 2A** USACE-Selected Alternative	**ALTERNATIVE 2B** Expanded Incised Trapezoidal Channel (FEMA Certification Performance), Accommodate Upstream Bypass Channel	**ALTERNATIVE 4** Walled Trapezoidal Channel (FEMA Certification Performance)
BIO-A. Perform Pre-Construction Nesting Bird Surveys	✓		✓	✓	✓
BIO-B. Compensate for Trees and Shrubs Removed During Construction	✓		✓	✓	✓
BIO-C. Use native grasses and forbs to hydroseed disturbed areas.	✓		✓	✓	✓
BIO-D. Provide Buffers Around Riparian Trees	✓		✓	✓	✓
Significance Determination Before Mitigation / After Mitigation	S / LM	NI	S / LM	S / LM	S / LM
Cultural Resources	Adverse impact on historical/archaeological site CA-SCL-593 (Impact CUL-1 and CUL-2) Potential adverse impacts on unknown cultural resources and human remains (CUL-4)	**(=)** No significant impacts	**(=)** Adverse impact on historical/archaeological site CA-SCL-593 (Impact CUL-1 and CUL-2). Potential adverse impacts on unknown cultural resources and human remains (CUL-2 and CUL-4)	**(+)** Adverse impact on historical/archaeological site CA-SCL-593 (Impact CUL-1and CUL -2).Potential adverse impacts on unknown cultural resources and human remains (CUL-2 and CUL-4)	**(+)** Adverse impact on archeological site CA-SCL-593 (Impact CUL-1 and CUL-2). Potential adverse impacts on unknown cultural resources and human remains (CUL-2 and CUL-4)
CUL-A. Implement the CA-SCL-593 MOA and HPMP	✓	✓	✓	✓	✓
CUL-B. Archaeological Monitoring and Unanticipated Discovery Plan	✓		✓	✓	✓
Significance Determination Before Mitigation / After Mitigation	S / LM	S / LM	S / LM	S / LM	S / LM
Geology, Soils, and Mineral Resources	Potential to expose structures or engineered slopes to adverse effects from seismic ground shaking (GEO-1). Potential for soil erosion or loss of topsoil (GEO-2)	**(-)** No significant impacts	**(-)** Potential to expose structures or engineered slopes to adverse effects from seismic ground shaking (GEO-1). Potential for soil erosion or loss of topsoil (GEO-2)	**(+)** Potential to expose structures or engineered slopes to adverse effects from seismic ground shaking (GEO-1). Potential for soil erosion or loss of topsoil (GEO-2)	**(+)** Potential to expose structures or engineered slopes to adverse effects from seismic ground shaking (GEO-1). Potential for soil erosion or loss of topsoil (GEO-2)
GEO-A. Implement Geotechnical Recommendations	✓		✓	✓	✓

ENVIRONMENTAL RESOURCE	**PROPOSED PROJECT** Widened Trapezoidal Channel (FEMA Certification Performance)	**NO PROJECT ALTERNATIVE**	**ALTERNATIVE 2A** USACE-Selected Alternative	**ALTERNATIVE 2B** Expanded Incised Trapezoidal Channel (FEMA Certification Performance), Accommodate Upstream Bypass Channel	**ALTERNATIVE 4** Walled Trapezoidal Channel (FEMA Certification Performance)
WAQ-C. Prepare and Implement a Rain Event Action Plan	✓		✓	✓	✓
Significance Determination Before Mitigation / After Mitigation	S / LM	LS	S / LM	S / LM	S / LM
Greenhouse Gases and Energy Use	Emissions of GHGs in excess of SMAQMD threshold (GHG-1)	**(-)** No significant impacts	**(=)** Emissions of GHGS in excess of SMAQMD threshold (GHG-1)	**(+)** Emissions of GHGs in excess of SMAQMD threshold (GHG-1)	**(+)** Emissions of GHGs in excess of SMAQMD threshold (GHG-1)
AIR-A. Reduce Construction Period Dust Emissions	✓		✓	✓	✓
AIR-B. Reduce Construction Equipment Emissions	✓		✓	✓	✓
Significance Determination Before Mitigation / After Mitigation	S / SU	NI	S / SU	S / SU	S / SU
Hazardous Materials	Potential for accidental spills or exposure to contaminated groundwater (HWM-1). Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment (HWM-2)	**(-)** No significant impacts	**(-)** Potential for accidental spills or exposure to contaminated groundwater (HWM-1). Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment (HWM-2)	**(+)** Potential for accidental spills or exposure to contaminated groundwater (HWM-1). Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment (HWM-2)	**(+)** Potential for accidental spills or exposure to contaminated groundwater (HWM-1). Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment (HWM-2)
HWM-A. Prepare and Implement Spill Prevention and Response Plan (SPRP)	✓		✓	✓	✓
HWM-B. Prepare and Implement Emergency Evacuation Plan	✓		✓	✓	✓
HWM-C. Treat VOC-Contaminated Groundwater Encountered at JCI Off-Site Area.	✓		✓	✓	✓

ENVIRONMENTAL RESOURCE	**PROPOSED PROJECT** Widened Trapezoidal Channel (FEMA Certification Performance)	**NO PROJECT ALTERNATIVE**	**ALTERNATIVE 2A** USACE Selected-Alternative	**ALTERNATIVE 2B** Expanded Incised Trapezoidal Channel (FEMA Certification Performance), Accommodate Upstream Bypass Channel	**ALTERNATIVE 4** Walled Trapezoidal Channel (FEMA Certification Performance)
TRA-A: Prepare and Implement a Transportation Management Plan*	✓		✓	✓	✓
WAQ-C. Prepare and Implement a Rain Event Action Plan*	✓		✓	✓	✓
Significance Determination Before Mitigation / After Mitigation	S / LM	NI	S / LM	S / LM	S / LM
Land Use and Planning	Conflict with Milpitas Trails Master Plan (LND-2)	(-= No significant impacts	**(=)** Conflict with Milpitas Trails Master Plan (LND-2)	**(+)** Conflict with Milpitas Trails Master Plan (LND-2)	**(+)** Conflict with Milpitas Trails Master Plan (LND-2)
LND-A: Allow Public Access to Creek Right of Way	✓		✓	✓	
Significance Determination Before Mitigation / After Mitigation	S / LM	NI	S / LM	S / LM	S / LM
Noise	Short-term exceedance of local noise standards (NOI-1) and substantial temporary increase in noise levels (NOI-4)	**(-)** No significant impacts	**(=)** Short-term exceedance of local noise standards (NOI-1) and substantial temporary increase in noise levels (NOI-4)	**(+)** Short-term exceedance of local noise standards (NOI-1) and substantial temporary increase in noise levels (NOI-4)	**(+)** Short-term exceedance of local noise standards (NOI-1) and substantial temporary increase in noise levels (NOI-4)
NOI-A. Alert Neighbors	✓		✓	✓	✓
NOI-B. Use Noise Suppression Techniques	✓		✓	✓	✓
NOI-C. Limit Construction Hours	✓		✓	✓	✓
Significance Determination Before Mitigation / After Mitigation	S / SU	LS	S / SU	S / SU	S / SU
Population and Housing	No significant impacts	**(=)** No significant impacts	**(=)** No significant impacts	**(=)** No significant impacts	**(=)** No significant impacts
Significance (No Mitigation)	LS	NI	LS	LS	LS

ENVIRONMENTAL RESOURCE	**PROPOSED PROJECT** Widened Trapezoidal Channel (FEMA Certification Performance)	**NO PROJECT ALTERNATIVE**	**ALTERNATIVE 2A** USACE Selected-Alternative	**ALTERNATIVE 2B** Expanded Incised Trapezoidal Channel (FEMA Certification Performance), Accommodate Upstream Bypass Channel	**ALTERNATIVE 4** Walled Trapezoidal Channel (FEMA Certification Performance)
Public Services	No significant impacts	**(=)** No significant impacts	**(+)** No significant impacts	**(+)** Adversely affect response times of emergency vehicles (PBS-1)	**(+)** Adversely affect response times of emergency vehicles (PBS-1)
TRA-A: Prepare and Implement a Transportation Management Plan*	✓		✓	✓	✓
Significance Determination Before Mitigation / After Mitigation	LS	LS	LS	S / LM	S / LM
Recreation	No significant impacts	**(-)** No significant impacts	**(=)** No significant impacts	**(=)** No significant impacts	**(=)** No significant impacts
REC-A. Detour Signage for Pedestrians and Cyclists*	✓		✓	✓	✓
LND-A: Allow Public Access to Creek right of way*	✓		✓	✓	
Significance Determination Before Mitigation / After Mitigation	LS	LS	LS	LS	LS
Transportation and Traffic	Conflict with a plan ordinance or policy establishing measures of effectiveness for performance of the circulation system (TRA-1). Hazards design features or construction vehicles (TRA-4). Inadequate emergency access (TRA-5). Conflict with plan or policy regarding public transit, bicycle, or pedestrian facilities (TRA-6).	**(-)** No significant impacts	**(=)** Conflict with a plan ordinance or policy establishing measures of effectiveness for performance of the circulation system (TRA-1). Hazards design features or construction vehicles (TRA-4). Inadequate emergency access (TRA-5). Conflict with plan or policy regarding public transit, bicycle, or pedestrian facilities (TRA-6).	**(+)** Conflict with a plan ordinance or policy establishing measures of effectiveness for performance of the circulation system (TRA-1). Hazards design features or construction vehicles (TRA-4). Inadequate emergency access (TRA-5). Conflict with plan or policy regarding public transit, bicycle, or pedestrian facilities (TRA-6).	**(+)** Conflict with a plan ordinance or policy establishing measures of effectiveness for performance of the circulation system (TRA-1). Hazards design features or construction vehicles (TRA-4). Inadequate emergency access (TRA-5). Conflict with plan or policy regarding public transit, bicycle, or pedestrian facilities (TRA-6).
TRA-A. Prepare and Implement a Traffic Management Plan	✓		✓	✓	✓

ENVIRONMENTAL RESOURCE	**PROPOSED PROJECT** Widened Trapezoidal Channel (FEMA Certification Performance)	**NO PROJECT ALTERNATIVE**	**ALTERNATIVE 2A** USACE Selected-Alternative	**ALTERNATIVE 2B** Expanded Incised Trapezoidal Channel (FEMA Certification Performance), Accommodate Upstream Bypass Channel	**ALTERNATIVE 4** Walled Trapezoidal Channel (FEMA Certification Performance)
HWM-B. Prepare and Implement Emergency Evacuation Plan*	✓		✓	✓	✓
Significance Determination Before Mitigation / After Mitigation	S / LM	LS	S / LM	S / LM	S / LM
Utility and Service Systems	Contaminated groundwater may exceed RWQCB water quality standards (UTL-1)	**(-)** No significant impacts	**(=)** Contaminated groundwater may exceed RWQCB water quality standards (UTL-1)	**(+)** Contaminated groundwater may exceed RWQCB water quality standards (UTL-1)	**(+)** Contaminated groundwater may exceed RWQCB water quality standards (UTL-1)
HWM-C. Treat VOC–contaminated Groundwater Encountered at JCI Off-site Area*	✓		✓	✓	✓
Significance Determination Before Mitigation / After Mitigation	S / LM	LS	S / LM	S / LM	S / LM
Hydrology and Water Quality	Significant water quality impacts from spills of hazardous materials, contaminated groundwater, and creek dewatering (WAQ-1, WAQ-5, and WAQ-6)	**(-)** No significant impacts	**(+)** Significant water quality impacts from spills of hazardous materials, contaminated groundwater, and creek dewatering (WAQ-1, WAQ-5, and WAQ-6)	**(+)** Significant water quality impacts from spills of hazardous materials, contaminated groundwater, and creek dewatering (WAQ-1, WAQ-5, and WAQ-6)	**(+)** Significant water quality impacts from spills of hazardous materials, contaminated groundwater, and creek dewatering (WAQ-1, WAQ-5, and WAQ-6)
WAQ-A. Implement Measures for Reducing Erosion and Protecting Water Quality	✓		✓	✓	✓
WAQ-B. Prepare and Implement a Dewatering Plan	✓		✓	✓	✓
WAQ-C. Prepare and Implement a Rain Event Action Plan	✓		✓	✓	✓
HWM-A. Prepare and Implement a Spill Prevention and Response Plan*	✓		✓	✓	✓
HWM-C. Treat VOC-contaminated groundwater encountered at the JCI off-site area*	✓		✓	✓	✓

ENVIRONMENTAL RESOURCE	**PROPOSED PROJECT** Widened Trapezoidal Channel (FEMA Certification Performance)	**NO PROJECT ALTERNATIVE**	**ALTERNATIVE 2A** USACE Selected-Alternative	**ALTERNATIVE 2B** Expanded Incised Trapezoidal Channel (FEMA Certification Performance), Accommodate Upstream Bypass Channel	**ALTERNATIVE 4** Walled Trapezoidal Channel (FEMA Certification Performance)
Significance Determination Before Mitigation/After Mitigation	S / LM	LS	S / LM	S / LM	S / LM

Table 5.6 Construction Features for Build Alternatives				
Construction Features	**Proposed Project**	**2A**	**2B**	**4**
Project Construction Duration ~~(Months)~~	September 2016 to December 2017~~One year, beginning in fall of 2017, or two years during dry seasons (May-October), starting in 2016~~			
Project Length (Linear Feet)	11,820		11,920	
Total Project Area (Acres)	37.21	35.71	38.71	36.84
Floodwall Length (All Reaches) (Linear Feet)	2,200	1,300	9,800	23,200
Total Excavation (Cubic yards)	90,000	90,000	123,464	175,500
Quantity Excavated (Reaches 1-3)	74,500	74,500	98,664	145,275
Quantity Excavated (Reaches 4)	15,500	15,500	24,800	30,225
Estimated Daily Truck Trips[1]	61	61	86	114
Remove excavated materials (Reaches 1-3)	38	38	50	72
Remove excavated materials (Reach 4)	8	8	14	16
Bring in materials and equipment (Reaches 1-3)	12	12	16	18
Bring in materials and equipment (Reach 4)	3	3	6	8
[1]Assumes 16 cy per truck trip, with each round trip reported as 2 truck trips.				

5.2.2.1. *No Project Alternative*

The No Project Alternative is analyzed within this EIR under CEQA Guidelines Section 15126.6(e), which states that the "no project" analysis shall discuss "…what is reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services."

This alternative assumes that the proposed project would not be constructed. No improvements to the existing flood control channels would occur. No improvements to the existing maintenance roads would occur, and ongoing problems associated with difficult access to the channel would continue. On-going maintenance and operation of existing facilities would continue as part of the District SMP2 and would include sediment and vegetation management.

Under the No Project Alternative, the current level of flood risk would remain and periodic floods would likely recur. The channel of Upper Berryessa Creek would continue to be unable to contain the 1% recurrence flow. Specifically, the following is likely to occur:

- Continuance and likely increase of the existing flood threat to the cities of Milpitas and San Jose,

- Result in increased future O&M costs compared to with-project conditions due to poor channel access, especially with respect to sediment removal and prevention/repair of bank erosion, flood response, and emergency costs.

The extent of flooding would be dependent on rainfall, but flood waters would likely result in the closure of streets and highways, and result in damages to homes, schools, infrastructure, and businesses that are located within the flood zone. As with past flooding, emergency repairs would be required and would include removal of large amounts of sediment that would be deposited by flood flows, repair of channel banks, access roads, surface roadways, and other facilities that could become inundated during flooding.

AESTHETICS. Under the No Project Alternative, visual conditions on a large-scale would remain the same, as they would result from land use and development regulations under the Milpitas and San Jose general plans. Trees in the channel and along overbank areas would not be removed. Small-scale or in-stream views would continue to be determined by local use. The floodwalls included as part of the project would not be built and would not be available for graffiti, although many existing structures in the project area would continue to provide areas for graffiti. In comparison to conditions anticipated under the proposed project, impacts to scenic resources from the No Project Alternative would be less extensive.

AIR QUALITY. Under the No Project Alternative, no construction activities would occur. Under most conditions, existing sources of air pollution would be expected to remain the same. Air quality would continue to be influenced by local and regional emissions from vehicles, local commercial and industrial land uses, and climate and geographic conditions.

Under the No Project Alternative, the current level of risk would remain for flooding in Milpitas and San Jose. The magnitude of the impact of flooding resulting from a flood event would depend on the severity of the storm. Cleanup actions in the event of a flood would require use of heavy construction equipment that would result in short-term, temporary emissions. The extent of these emissions are dependent on the extent of flooding that would occur in the Upper Berryessa Creek area, but based on past flooding, flooded areas would include the project area and significant areas downstream of the proposed project area, necessitating a very extensive flood response and cleanup operation. It is also expected that extensive repairs to the Upper Berryessa Creek channel would be required after each large flood, resulting in emissions from operation of vehicles and equipment. Flood response and cleanup operations after individual floods would likely result in periodic air quality impacts of much shorter duration than would occur under the proposed project, so air quality impacts under the No Project Alternative would be less extensive than under the proposed project.

BIOLOGICAL RESOURCES. Under the No Project Alternative, construction impacts of the proposed project would be avoided. The current level of risk would remain for flooding in Milpitas and San Jose. The magnitude of the impact of flooding resulting from a flood event would depend on the severity of the storm event. During operations, increased flooding could affect downstream biological resources but the extent of such impacts is speculative. Any impacts from the No Project Alternative would be restricted to already generally poor quality biological features and would be less than significant. Overall, biological impacts of the No Project Alternative would be less than the proposed project's impacts.

CULTURAL RESOURCES. Under the No Project Alternative, no construction activities would occur and the benefits of flood protection would not be realized. Accordingly, no ground disturbance as a result of construction would occur and there would be no risk of impacts on cultural resources from construction. Impacts would be less than for the proposed project and less than significant.

GEOLOGY, SOILS, AND MINERAL RESOURCES. Under the No Project Alternative, current levels of erosion would continue. Erosion and loss of topsoil would be more extensive under this alternative than under the proposed project, since the channel walls in many locations are much steeper than they would be under proposed conditions, and water velocities under flood flows would be likely higher. Furthermore, loss of topsoil during floods would likely occur outside of the stream channel, meaning that the effects would be more widespread than under proposed conditions, under which flood flows are much more likely to be contained within the channel. Maintenance activities, including sediment and vegetation removal would continue but would not result in impacts on geology and soils. Also, although the proposed project may result in loss of topsoil during construction, this impact would be largely confined to the construction period, whereas erosion and loss of topsoil due to flooding would be expected to recur every 5-10 years. Impacts from operations and maintenance would be greater than under the proposed project as there would be more frequent need for sediment removal, resulting in soil disturbance, but would be less than significant.

GREENHOUSE GASES. Equipment used for flood response and cleanup would emit GHGs but in amounts that are not likely to result in significant generation of GHGs. Over time, the use of heavy machinery for multiple cleanup efforts and flood response is likely to generate considerable GHGs, but the effects would not be significant and less than GHG emissions generated by the proposed project.

HAZARDOUS MATERIALS. Under the No Project Alternative, no construction activities would occur; therefore, no accidental spills of hazardous materials would occur from construction. Impacts would be less than for the proposed project. Potential exposure to existing sources of hazardous materials would be expected to remain the same. Downstream of I-680 are two sites of concern near the project area: Jones Chemical Company and Great Western Chemical Company. These sites contain plumes of contaminated groundwater. If the ongoing remediation efforts do not successfully contain or treat the groundwater plumes, then groundwater contamination could migrate into the project area in the future.

LAND USE AND PLANNING. There would be no changes in land uses during operations as a result of the No Project Alternative. Operation and maintenance of the creek and overbank areas would not change and the impacts of operations and maintenance on adjacent land uses would be the same as existing conditions, though frequencies and intensities may change over time. This alternative would avoid removal of the existing section of trail upstream of Los Coches Street, but would also not construct crossings at Los Coches and Piedmont creeks that could accommodate a new longer trail as envisioned in the Milpitas Trails Master Plan. The proposed project would remove the existing section of trail but would build the two creek crossings that would benefit a future trail if built. Overall, impacts would be the same as for the proposed project.

NOISE. Under the No Project Alternative, no construction activities would occur; therefore, no potential exists for the project to generate short-term or long-term construction noise. The levels of noise and vibration would continue to be influenced by roadway traffic, human activities, and other sources such as wind. Noise-sensitive receptors would be expected to experience the same noise conditions as under existing conditions. Impacts would be less than for the proposed project.

POPULATION AND HOUSING. Under the No Project Alternative, there would be no construction and therefore no change in population and housing conditions. Current levels of flood risk would persist, exposing area residents to occasional risk of flooding. These impacts would likely occur on a very occasional basis and would be temporary, therefore they are expected to be less than significant. Impacts would be similar to those occurring under the proposed project.

PUBLIC SERVICES. Under the No Project Alternative, the need for public services related to the Upper Berryessa Creek channel is generally minimal. However, periodic floods with a recurrence interval of 5-10 years would result in increased demand for public services including emergency responders, crews and equipment for cleanup and flood response, and to assist with impacts to traffic. However, emergency response demands during proposed project construction would be avoided under the No Project Alternative. Overall, public services impacts would be similar to the proposed project.

There would be no changes to operation and maintenance of the Upper Berryessa Creek channel. Emergency response vehicles would have similar access to the channel and the surrounding area. Channel conditions would continue to be monitored and if risks to safety were found, such as eroding banks or potential infrastructure failures, they would be repaired or resolved.

RECREATION. Under the No Project Alternative, no construction activities would take place and no changes to unofficial pedestrian or cycling use of the overbank access roads would result. Occasional loss of recreational opportunities may occur during floods if access to parks was restricted, but there are few recreational facilities in the area. Although the potential for this type of impact to occur is greater under the No Project Alternative than under proposed project, overall recreation impacts of the No Project Alternative would be less than the proposed project's impacts.

Under the No Project Alternative, the overbank areas of the Upper Berryessa Creek channel may eventually be developed into an official part of the City of Milpitas Bikeways trail system. Until then, incidental use of the channel by pedestrians or bicyclists would continue to occur.

TRANSPORTATION AND TRAFFIC. Under the No Project Alternative, no construction activities would occur, so there would be no construction-related impacts to traffic or transportation. The existing roadway network, types of traffic, and circulation patterns would be expected to experience increases in traffic of 1 percent each year based on historical trends and a qualitative assessment of the on-going economic recovery in the region (Kittelson 2012). Table 5.7 compares existing traffic to the projected 2017 traffic at the key intersections in the study area. Traffic impacts would be less than for the proposed project.

Table 5.7 Existing and 2017 Baseline Levels of Service at Key Intersections

Intersection	Existing				2017 Base			
	AM Peak		PM Peak		AM Peak		PM Peak	
	LOS	Delay (in seconds)	LOS	Delay (in seconds)	LOS	Delay (in seconds)	LOS	Delay (in seconds)
Jacklin Rd. & I-680 Northbound Ramps	N/A		B	16.2	N/A		B	16.3
Jacklin Rd. & I-680 Southbound Ramps	N/A		B+	11.5	N/A		B+	11.8
Calaveras Blvd. & I-880	B	12.5	B	16.8	B	13.3	B-	18.1

Northbound Ramps								
Calaveras Blvd. & Abel Street	D+	38.1	D	44.1	D	40.0	D	46.5
Calaveras Blvd. & Milpitas Blvd.	D	40.2	D	44.1	D	42.5	D	48.8
Great Mall Pkwy. & I-880 Northbound Ramps	C	27.1	C+	20.3	C	29.9	C+	21.5
Great Mall Pkwy. & Abel St.	D	40.7	D+	36.7	D	40.7	D+	35.9
Montague Exp. & Capitol Blvd.	D	49.7	E+	56.6	E+	57.6	E	61.0
Montague Exp. & Milpitas Blvd	D	39.6	D+	35.1	D	50.7	D	43.2
Montague Exp. & I-680 Northbound Ramps	D	40.5	D	46.2	D	44.7	D-	51.1
Montague Exp. & Main St./Old Oakland	E	68.1	D-	54.8	E-	75.7	E	64.8
Montague Exp. & Trade Zone Blvd.	F	94.8	F	81.4	F	96.3	F	91.9

UTILITIES AND SERVICE SYSTEMS. There would be no construction associated with this alternative and, therefore, no construction impacts would result. Existing utilities would remain in place. Maintenance actions would continue but would be unlikely to result in adverse impacts to utilities or service systems. Overall impacts to utilities and service systems would be less than under the proposed project.

Under the No Project Alternative, damage to utilities may occur. Extensive channel incision or erosion of banks may expose buried power, gas, sewer, or water lines. Flooding may also cause sewer failure and overwhelm stormwater facilities. However, overall impacts to utilities and service systems would be less than under the proposed project.

HYDROLOGY AND WATER QUALITY. Under the No Project Alternative, construction-related water quality impacts of the proposed project would be avoided. The current level of risk would remain for flooding in Milpitas and San Jose. The magnitude of the impact of flooding resulting from a flood event would depend on the severity of the storm. The District would continue to manage the project area under SMP2, leading to less soil disturbance and less turbidity than under the proposed project.

Erosion of channel banks during low and high flow events and flooding would continue and increase over time as more eroded surface area is exposed, causing increasing sediment load, suspended solids, and nutrient loading downstream. Although this would not directly result in a violation of water quality standards, it would contribute to degradation of water quality and habitat value downstream. Overall, hydrology and water quality effects of the No Project Alternative would be greater than under the proposed project due to increased operational impacts.

5.2.2.2. *Alternative 2A: Widened Incised Trapezoidal Channel (FEMA-Certification Performance)*

Alternative 2A was authorized as the USACE's selected alternative. This alternative would increase flood conveyance relative to current conditions and would meet the USACE's goal of containing the 100-year

flood. However, it would not meet FEMA certification requirements, and therefore would not fully meet the District's objectives for this project.

Under Alternative 2A, a 1,300-foot concrete floodwall, 1.5 feet in height, would be installed on the west overbank area from a point upstream from Los Coches Street and ending at the confluence of Piedmont Creek and Upper Berryessa Creek. This floodwall would be cast in place, and would be constructed between the top of bank and the west access road. The total length of this floodwall would be approximately 900 feet shorter than the proposed project floodwall (2,200 feet), which has a maximum 2 foot height. In all other respects, including modifications to bridges and trestles, Alternative 2A is identical to the proposed project. Representative cross sections of Alternative 2A are shown in Figure 5.1.

AESTHETICS. Construction of Alternative 2A would result in impacts similar to, but less than the proposed project. The primary difference would be that Alternative 2A would have a floodwall in Reaches 1-3 that would be shorter in length and height. Despite the difference in floodwall length, the presence of the floodwall would change the overall visual character of Reaches 2/3, in both Alternative 2A and the proposed project, meaning that little difference between the two alternatives would be noted by viewer groups. Overall, due to the already industrialized use of the area and associated visual conditions, the introduction of the floodwall would not substantially change the character of the channel. Visual impacts would be less than significant under both alternatives, and in comparison to the proposed project, this alternative would have only an incrementally smaller impact on aesthetics.

AIR QUALITY. Emissions under this alternative would exceed local significance thresholds for NOx, resulting in a significant and unavoidable impact. The air quality emissions under this alternative are slightly less than for the proposed project, shown in Tables 3.6 and 3.7. Although construction under this alternative would be slightly reduced relative to the proposed project, it would still result in a significant and unavoidable impact to air quality.

Operation and maintenance of this alternative would be similar to maintenance practices for the proposed project, but maintenance needs would be slightly reduced due to the shorter floodwall. Removal of sediment and other maintenance requirements would still occur at the same levels under this alternative in comparison to the proposed project. As a result, there would be no additional long-term increase in regional emissions of criteria pollutants associated with maintenance activities and vehicle trips. This alternative would conform to applicable Federal and State standards, and local thresholds on a long term basis.

BIOLOGICAL RESOURCES. Alternative 2A would have comparable impacts to biological resources in comparison to the proposed project. A shorter floodwall would place less restriction on wildlife access to the stream, although there is not likely to be significant presence of wildlife in the project area. This slight reduction in impacts would not significantly change the level of impact from those described in the proposed project. Biological impacts would be significant, but less than significant after mitigation.

CULTURAL RESOURCES. Impacts to cultural resources are the same under this alternative as for the proposed project. As with the proposed project impacts, significant impacts could occur to known human remains under this alternative, but mitigation measures described in Section 3.6.6 would reduce these effects to less than significant.

GEOLOGY, SOILS AND MINERALS. Because Alternative 2A would have the same construction footprint but slightly less excavation quantities, it would have slightly less impacts related to loss of topsoil, but the same ground shaking impacts as the proposed project. These impacts would be significant, but less than significant after mitigation.

GREENHOUSE GASES. GHG emissions from construction and operations under this alternative would be slightly reduced relative to the proposed project due to slightly less construction for the shorter floodwall, and reduced operational activities overall. During construction, Alternative 2A would generate GHGs at levels above the SMAQMD significance threshold, which would be a significant impact. Implementation of Mitigation Measures AIR-A and AIR-B would help to offset these emissions, but emissions would still be above SMAQMD significance thresholds, therefore this impact is unavoidable. Emissions during operations would be well below threshold value, and would be less than significant.

Alternative 2A would not conflict with any plan, policy, or regulation of an agency adopted to reduce the emissions of GHGs, and the mitigation measures listed in Section 3.3.6 would be implemented to contribute to a lower carbon footprint. These impacts would be less than significant.

HAZARDOUS MATERIALS. Potential effects related to hazardous materials under Alternative 2A are the same as under the proposed project except that the concrete floodwall constructed on the west bank would be somewhat shorter. This reduction would require slightly less excavation and less construction time, which could slightly reduce the chances of spills of hazardous materials routinely used in construction. Potential impacts from worker exposure to VOCs from the Great Western or Jones Chemical plumes would be the same, as any differences between the alternatives are restricted to the overbank area on the west bank, well above the level of the plume. The associated risks of exposure of workers and the public to hazardous materials would be slightly less than under the proposed project for construction and operations (significant, but less than significant with mitigation). Potential impacts to emergency access or evacuation plans would be less than significant with mitigation, the same as for the proposed project.

LAND USE AND PLANNING. Impacts to land use from construction and operations under Alternative 2A would be the same as under the proposed project. There would be no physical division of communities. Alternative 2A would include the construction of fences and gates that would prevent public access to the creek ROW. This alternative would also construct creek access roads and culverts crossing Los Coches and Piedmont Creeks that could accommodate a future recreational and transportation trail as described in the Milpitas Trails Master Plan. Similar to the proposed project, future development of that trail in Reaches 1 through 3 would require the City and District to execute a JUA to allow public access to a trail on the creek ROW. This alternative would result in a conflict with the Milpitas Trails Master Plan (as would the proposed project) which would be a significant impact. Implementation of Mitigation Measure LAN-1 would reduce this impact to less than significant.

Minor and temporary changes in land uses would occur at the staging areas, but these areas would be restored to their original condition and uses after completion of construction, so this impact would be less than significant. Overall impacts from this alternative would be the same as under the proposed project, and would be less than significant.

NOISE. Temporary increases in noise levels would result from excavation of the channel, construction of the floodwall, and construction of the replacement culvert at the UPRR Trestle. The duration of noise impacts from construction would be slightly reduced relative to the proposed project, as construction

needed for the floodwall is less than what would be needed for construction of the floodwall under the proposed project. Ongoing maintenance of the stream channel may result in minor noise effects associated with maintaining floodwalls or culverts, or repairing access roads, but effects would be the same as under the proposed project. These actions would be performed by small crews using light to medium duty equipment, and would be temporary, therefore impacts would be less than significant. Noise impacts from Alternative 2A would be slightly less than under the proposed project. Most noise impacts would be significant, but less than significant with mitigation. However, as with the proposed project, noise impacts associated with replacement of the UPRR trestle with a concrete box culvert would occur outside of Milpitas' allowable construction times of 7:00 am to 7:00 pm over the course of a 72-hour period, and would be significant and unavoidable. In addition, the temporary increase in ambient noise during construction of this alternative would also likely be significant, as is the case for the proposed project.

POPULATION AND HOUSING. Impacts from Alternative 2A to population and housing would be identical to those of the proposed project, and would be less than significant.

PUBLIC SERVICES. Impacts from Alternative 2A to public services would be less than significant with mitigation and the same as for the proposed project.

RECREATION. Impacts from Alternative 2A to recreation would be identical to those of the proposed project. The pocket park would be removed, resulting in the loss of this recreational resources, but this would still be a less than significant impact to recreation overall.

TRAFFIC AND TRANSPORTATION. The types of impacts from implementing Alternative 2A would be slightly less than those from the proposed project. Potential impacts on traffic flow would be slightly reduced since the shorter floodwall would require less materials, resulting in fewer haul trucks entering and exiting the access roads between Calaveras Boulevard and Ames Avenue. The main sources of potential impacts would be associated with temporary lane closures on Los Coches Street, Yosemite Avenue, and Ames Avenue, and with temporary traffic slowdowns when haul trucks enter or exit the access roads and staging areas. Similarly to the proposed project, lane closures would not require diversion to other streets and with the presence of flaggers, orderly traffic flow will be maintained. Other types of impacts from construction and operations would be similar to the proposed project. Traffic impacts would be significant, but less than significant with implementation of mitigation measures described in Section 3.15.6.

UTILITIES AND SERVICE SYSTEMS. This alternative would have the same potential to encounter VOC-contaminated groundwater at the JCI off-site area as the proposed project. Impacts associated with contaminated groundwater exceeding RWQCB water quality standards would be the same under this alternative as under the proposed project. This impact would be significant, but less than significant after mitigation consisting of treating the contaminated groundwater before discharging it to the creek.

HYDROLOGY AND WATER QUALITY. In comparison to the proposed project, Alternative 2A would slightly reduce the risk of a spill or discharge of uncured concrete or other hazardous materials into the water as a result of requiring a shorter floodwall in Reaches 2/3, and may result in slightly less opportunity for a violation of water quality standards. However, there would still be the potential for impacts and the alternative would require the same mitigation measures as described in Section 3.17.6, resulting in a less than significant impact with mitigation that would be similar as for the proposed project. Impacts to groundwater quality, changes to drainage patterns, or generation of polluted runoff

would be the same as for the proposed project, and all impacts would be less than significant with mitigation.

5.2.2.3. *Alternative 2B: Expanded Incised Trapezoidal Channel (NFIP-Certification Performance)*

Alternative 2B proposes an earthen trapezoidal channel section with varying bottom widths. Most of the construction components are similar to those described for the preferred alternative, with the primary differences being the length of floodwalls, amount of material excavation, and construction of new bridges at Calaveras Boulevard and Los Coches Street. This alternative is designed assuming a bypass structure is in place through a greenbelt reach along Berryessa Creek upstream of I-680, with the intent to reduce flooding in the upper watershed. The structure would route high flows around the greenbelt reach to reduce flooding in the upper watershed. The bypass structure would be developed and implemented by the District as a locally funded project, and is not evaluated in this document.

Typical sections showing the overall configuration of Alternative 2B are shown in Figure 5.2. The primary features of Alternative 2B are as follows;

- Channel excavation and earthen levee construction to the water surface level of the 95 percent certainty, 1% exceedance probability event discharge from I-680 to Calaveras Boulevard (proposed channel dimensions for various reaches are shown in Figure 5-2),
- 2H:1V sideslopes with turf reinforcement mats and buried rock revetment for scour protection,
- Free-standing concrete floodwalls in the immediate vicinity of Montague Expressway and between Yosemite Drive and Calaveras Boulevard on both banks resulting in a total installation length of 9,800 feet,
- Access road intermittently along one or both banks, within the channel (between the 0.1 and 0.04 exceedance probability events),
- Replacement of UPRR trestle with a 2-barrel box culvert,
- Replacement of UPRR culvert with a 60-foot span,
- Shoring of bridge abutments at Ames Avenue and Yosemite Drive to accommodate widened channel,
- Replacement of Los Coches Street Bridge with 100-foot span,
- Replacement of Calaveras Boulevard Bridge with 100-foot span, and
- Utility relocations, as needed.

Replacement of the UPRR trestle would be the same under this alternative as for the proposed project. However, under this alternative the existing UPRR culvert upstream of Ames Avenue would also be replaced with a new bridge. Replacement of the UPRR culvert would occur on an expedited schedule to minimize the amount of time the line is out of service (similar as for the UPRR trestle replacement under the proposed project) and would likely require after hours construction work.

Calaveras Boulevard Bridge is an eight-lane divided roadway. The crossing comprises four 8-foot-high-by-11-foot wide culvert barrels. In order to provide the necessary conveyance capacity for Alternative 2B, the culvert barrels would need to be replaced by a 100-foot open span bridge. The sideslopes would be 2H:1V to match the excavated channel footprint for Alternative 2B, and vertical abutments would be needed for Alternative 4.

The Lower Berryessa Creek Project, described in the cumulative impacts section, is assumed to be constructed prior to the operation of any of the project alternatives under consideration. The Lower Berryessa Creek Project extends to the existing Calaveras Boulevard Bridge but does not include modifications to the structure itself; as such, the project improvements proposed for Alternatives 2B include a transition to match the Lower Berryessa Creek Project approximately 50 feet downstream of Calaveras Boulevard Bridge.

Replacing the Calaveras Boulevard Bridge would require closure of half of the travel lanes for a period of 120 days. Partial traffic flow would be maintained at all times by restriping the open portion of the roadway to leave two lanes of traffic in each direction.

Los Coches Street would be completely closed along the construction area for 60 days to allow installation of a 100-foot bridge span. Full closures of streets would temporarily require vehicles, bicycles and pedestrians to use alternative traffic routes and parking lanes during the construction period.

One traffic lane and one parking lane would be closed on Yosemite Drive for up to 10 days. Traffic would continue to use two lanes in one direction but only one lane in the other direction. This would add delays to traffic on Yosemite Drive but would not require diversion to alternative routes.

One traffic lane and one parking lane would be closed on Ames Road for up to 10 days. The traffic flow on Ames Avenue could be maintained on the single available lane using construction flagging during the period of lane closure.

Minor parking lane closures would occur surrounding ingress and egress points for construction vehicles.

AESTHETICS. Under Alternative 2B the types of construction period effects on aesthetics would be similar to but greater than the proposed project. Excavation would increase in all reaches, increasing to 98,664 cy in Reaches 1-3 and 24,800 cy in Reach 4, requiring additional truck trips in comparison to the proposed project. The additional truck trips would temporarily reduce the visual quality of the area, but would not substantially increase the level of impact in comparison to the proposed project. The truck traffic would be temporary and would occur in an already industrialized area, where visual quality is already compromised.

The total length and location of floodwalls would increase from approximately 2,200 linear feet under the proposed project, to 9,800 linear feet in this alternative (4,900 feet on both sides of the creek), with floodwalls located near Montague Expressway and extending between Yosemite Drive and Calaveras Boulevard, a much longer distance than included for the proposed project. This would result in increased impacts to visual condition in comparison to the proposed project. As with the proposed project, the introduction of floodwalls into the already industrialized and artificial environment of Upper Berryessa Creek channel would not substantially change the character of aesthetics. However, because the floodwalls would be much longer than those that would be installed under the proposed project, there would be much more room for graffiti. The additional maintenance that would be needed to remove graffiti would increase the use of staff, equipment, and solvents relative to the proposed project. This would be a less than significant impact to visual resources since the District would control graffiti regularly, but the level of effect associated with use of solvents and equipment would be increased compared to the proposed project.

Under this alternative, several bridges would be replaced. The UPRR culvert would be replaced with a 60-foot bridge span, and both Los Coches Bridge and Calaveras Bridge culverts would be replaced with a 100-foot bridge span. Transition structures would tie bridges into the newly graded trapezoidal channels, resulting in an overall improvement in visual quality to the area from existing conditions. However, in comparison to the proposed project, changes to aesthetics would be minimal, since the proposed project also includes new transition structures. Alternative 2B would have less than significant impacts and be comparable in aesthetic impacts to the proposed project.

AIR QUALITY. Table 5.8 shows air emissions from construction activities in Reaches 1-3 and Reach 4 based on results of the modeling for Alternative 2B. During construction this alternative would not produce emissions exceeding BAAQMD significance thresholds for criteria pollutants with the exception of NOx. The estimated worst-case annual NOx emissions generated from implementation of Alternative 2B would not exceed Federal thresholds, but would exceed BAAQMD thresholds and therefore, this impact would be significant and unavoidable. NO_x emissions would be slightly greater than under the proposed project.

Table 5.8 Modeled Air Quality Emissions (Alternative 2B)

Criteria Pollutant	ROG	CO	NO_x	PM_{10}	$PM_{2.5}$	CO_2
Reaches 1-3						
Estimated Daily Emissions	8.9 lbs*	48.4 lbs*	102.2 lbs*	24.6 lbs*	8.2 lbs*	13,188 lbs*
Estimated Project Emissions	<1 ton	4.9 tons	9.2 tons	2.7 tons	<1 ton	1,145 tons
BAAQMD Project Construction Thresholds***	54 lbs./day	N/A	54 lbs/day	72 lbs/day	54 lbs/day	N/A
Federal Conformity Rule Thresholds	50 tons/year**	100 tons/year**	50 tons/year**	100 tons/year**	N/A	N/A
SCAQMD Construction Thresholds for GHGs	N/A	N/A	N/A	N/A	N/A	1,210 tons/year
Exceed Thresholds	No	No	Yes	No	No	No
Reach 4						
Estimated Daily Emissions	8.2 lbs *	44.4 lbs *	89.3 lbs *	24.2 lbs *	8.0 lbs *	10,067 lbs *
Estimated Project Emissions	<1 ton	4.5 tons	8.4 tons	2.7 tons	<1 ton	941 tons
BAAQMD Project Construction Thresholds***	54 lbs./day	N/A	54 lbs/day	72 lbs/day	54 lbs/day	N/A
Federal Conformity Rule Thresholds	50 tons/year**	100 tons/year**	50 tons/year**	100 tons/year**	N/A	N/A
Criteria Pollutant	**ROG**	**CO**	**NO_x**	**PM_{10}**	**$PM_{2.5}$**	**CO_2**
Exceed Thresholds	No	No	Yes	No	No	No

ROG=reactive organic gases, NO_x=nitrogen oxides, CO=carbon monoxide, CO_2=carbon dioxide, PM_{10}=particulate matter less than 10 microns. $PM_{2.5}$=particulate matter less than 2.5 microns.*Represents maximum pounds per day, usually during grading/excavation phase.
**Per year or for construction period, whichever is shorter.

Operation and maintenance under this alternative would be similar to the proposed project, although increased maintenance trips may be necessary due to the longer floodwalls. However, it is not expected that the increase in trips would be substantial enough in comparison to maintenance requirements under the proposed project to result in increased emissions. As a result, long-term increase in regional emissions of criteria pollutants associated with maintenance activities and vehicle trips would be minimal, and impacts would be less than significant. Implementation of Alternative 2B would conform to applicable Federal and State standards and local thresholds on a long term basis. Operational impacts would be slightly greater than the proposed project and less than significant.

BIOLOGICAL RESOURCES. Potential impacts to wetlands, special status species including migratory birds, and stands of healthy trees and shrubs would be the same as for the proposed project, and would be significant but less than significant with mitigation specified in Section 3.5.6.

The addition of substantially more floodwall length and height under this alternative would impair wildlife access to the channel to a much greater degree than under the proposed project, but would not substantially increase effects associated with its use as a dispersal corridor. Given the low habitat value in the project area, low utilization of this area by wildlife in general, and its lack of suitability to support protected or sensitive species specifically, this impact would be less than significant, but still greater than under the proposed project.

CULTURAL RESOURCES. Based on the expected extent of ground disturbance represented by the total soils exported per day and the increased project footprint, Alternative 2B would have more potential than the proposed project to impact cultural resources. Since the extent of archeological resources present is unknown, as with the proposed project, it would be necessary to implement mitigation measures as described in Section 3.6.6 to ensure proper protection of any unearthed cultural resources. With mitigation in place, the potential impact under this alternative to impact cultural resources would be less than significant with mitigation, but would have the potential to result in greater impacts than the proposed project.

GEOLOGY, SOILS AND MINERALS. Because Alternative 2B would have greater excavation quantities and longer floodwalls than under the proposed project, it would have greater impacts related to erosion or ground shaking as the proposed project. These impacts would be significant, but less than significant after mitigation.

GREENHOUSE GAS EMISSIONS. Table 5.8 summarizes CO2 emissions from activities undertaken during construction. The amount of CO2 emissions is estimated to be 1,145 tons in Reaches 1-3 and 941 tons in Reach 4. Alternative 2B GHGs would exceed SMAQMD significance thresholds (1,210 T/yr) for annual GHG emissions. Impacts from GHG emissions would be significant and unavoidable and slightly greater than for the proposed project.

HAZARDOUS MATERIALS. Alternative 2B differs from the proposed project in the area and amount of excavation and replacement of bridges and culverts. These additions would require more soil disturbance and introduction of materials including concrete, which could provide more opportunity for spills of hazardous materials routinely used in construction, and for greater risk to workers from increased exposure to potential VOC contamination from the JCI Site and Great Western Site plumes. However, taking these potential increased risks into account, and assuming the mitigation measures proposed in Section 3.9.6 are implemented, the associated risks to workers and public would be less

than significant with mitigation, and greater than under the proposed project. Impacts associated with accidental spills of hazardous materials from implementing Alternative 2B would be avoided or minimized through the implementation of the District's BMPs and creation and implementation of a Spill Prevent and Response Plan (SPRP). Similarly to the proposed project, impedance of emergency access or evacuation routes would be less than significant with mitigation described in Section 3.16.6.

As discussed for the proposed project, the potential for impacts associated with hazardous materials in Reach 4 is low during construction, assuming implementation of mitigation measures identified in Section 3.9.6. Potential effects associated with use of fuels, solvents, and other potentially hazardous materials is higher than under the proposed project since construction activities would be more extensive, but mitigation measures would reduce risks associated with this impact to less than significant. Potential for effects occurring during operations would be higher than under the proposed project since the floodwalls would be more extensive and require additional maintenance and removal of graffiti. However, potential impacts associated with during operations are still anticipated to be less than significant due to reduced needs for operations actions overall.

LAND USE AND PLANNING. Alternative 2B would occur within the same area as the proposed project and would therefore have impacts on land use and planning similar to the proposed project. However, because this alternative would not install culverts at Los Coches Creek and Piedmont Creek as would the proposed project, a future continuous recreational and transportation trail in Reaches 1 through 3 as proposed as part of Milpitas' Trails Master Plan would be more costly under this alternative than under the proposed project due to the need for post-project construction of crossings of Los Coches and Piedmont creeks. The proposed project would construct those creek crossings. Under this alternative, Upper Berryessa Creek would be widened and this may preclude construction of creek access roads that could accommodate a future trail open to public use. At the very least, implementation of this alternative would require costly construction of a footbridges at these locations to allow the proposed trail to cross these creeks and execution of a JUA between the City of Milpitas and the District to allow public access to a trail on the Creek ROW. This alternative would result in a conflict with the Milpitas Trails Master Plan (as would the proposed project) which would be a significant impact.

NOISE. The types and duration of construction noise under Alternative 2B would be the same as the proposed project, but the potential noise levels would be higher due to an increase in truck trips and additional use of excavators and scrapers needed for increased excavation work and bridge and culvert replacements. With the implementation of mitigation measures identified in Section 3.11.6, most noise impacts would be less than significant with mitigation, but would still be greater than noise impacts under the proposed project. However, noise impacts associated with replacement of the existing UPRR trestle with a concrete box culvert and replacement of the existing UPRR culvert with a bridge would occur outside of Milpitas' allowable construction times of 7:00 am to 7:00 pm over the course of a 72-hour period, and would be significant and unavoidable. In addition, the temporary increase in ambient noise during construction of this alternative would also likely be significant, as is the case for the proposed project.

Ongoing maintenance of the stream channel and structures would be the same as under the proposed project, but may require more visits over the course of any given year, due to the increased number of features requiring maintenance and the increased length of the floodwall. However, the increased number of trips would not in themselves increase noise impacts from current levels, and actions associated with maintenance of floodwalls, culverts, and access roads would be short-term.

POPULATION AND HOUSING. Impacts from Alternative 2B to population and housing would be identical to those of the proposed project; less than significant.

PUBLIC SERVICES. Like the proposed project, this alternative would not result in increased need for public services, or make a public service unavailable, therefore there would be no impact associated with these criteria.

Due to temporary lane closures and traffic delays during construction of the Calaveras Boulevard and Los Coches Street Bridges, there is the potential for significant adverse impacts to emergency vehicles responding to needs within the project area or surrounding areas. This impact is greater under this alternative than under the proposed project. Prior to construction, a traffic management plan would be prepared and approved by Caltrans and the cities of Milpitas and San Jose. Any road or lane closures would be identified, along with duration of closure and proposed detour routes. This traffic management plan would be presented to emergency agencies in the area. During construction, in areas where lane closures are occurring, emergency vehicle movements would be given priority. Emergency vehicle response times are not anticipated to increase significantly with adequate coordination. However, impacts to emergency response time would be greater under this alternative than under the proposed project due to closure of one lane of traffic on Calaveras Boulevard. These impacts are anticipated to be temporary during construction and less than significant with mitigation specified in Section 3.16.6.

RECREATION. Impacts from Alternative 2B to recreation would be similar to those of the proposed project. The pocket park near Los Coches Street would be removed, resulting in a loss of the park, but the impact to recreation would be less than significant since there are other parks in the vicinity that can replace the lost values. Because this alternative would lack the installation of culverts at Los Coches Creek and Piedmont Creek that would be included as part of the proposed project, a continuous recreational trail proposed as part of Milpitas' Trails Master Plan would be less viable under this alternative. However, implementation of this alternative would not prevent the city from constructing footbridges at these locations or implementing other measures to allow the proposed trail to cross these creeks, therefore the impact upon recreation is less than significant, and the same as under the proposed project.

TRAFFIC AND TRANSPORTATION. Traffic volume would increase under this alternative in comparison to the proposed project as a result of increased construction crew commuter trips. In general, up to 40 workers would access the construction zone on a daily basis, with up to 50 workers on specific occasions. Most workers would likely enter the construction zone before 7:00 AM and leave between 4:00-5:00 PM.

Construction trucks would access the staging and construction areas off of adjacent streets. Up to 86 truck trips per day (approximately 9 per hour) are expected during construction throughout the project area. While the presence of these vehicles would incrementally add to area traffic, analysis of carrying capacity of surrounding streets indicates that impacts associated with this number of truck trips and construction crew commuter trips on surrounding traffic congestion would be greater than under the proposed project but less than significant.

Traffic delays and congestion may occur due to lane closures on Calaveras Boulevard, Los Coches Street, Yosemite Drive, and Ames Avenue. Bridge construction would occur at the Upper Berryessa Creek crossing east of North Hillview Drive. Partial road closures on Calaveras Boulevard would last up to 120

days. Half of the existing lanes would be closed for that period. Partial traffic flow would be maintained at all times by restriping the open portion of the roadway to two lanes in each direction. As a worst case analysis, it is assumed that with partial closure of Calaveras Boulevard, 50 percent of the traffic in the eastbound direction would choose to divert from Calaveras Boulevard to alternative routes. Existing traffic counts at each intersection on Calaveras Boulevard were used to estimate the origins and destinations of traffic through the affected area. Based on proportions of turn movements, it was estimated that approximately 50 percent of the traffic in each direction is destined towards the north and 50 percent towards the south (Kittelson 2012). Although several alternative routes would be available, as a conservative analysis all diverted traffic was assumed to use Great Mall Parkway and Montague Expressway to cross between I-880 and I-680 in each direction. Table 5.9 summarizes the level of service at the study intersections during a partial closure.

During the AM peak hour, the Montague Expressway/Capitol Avenue intersection would change from LOS of E to an LOS of F. During the AM and PM peak hour, Montague Expressway/Main Street/Old Oakland intersection LOS would change from an LOS of E to an LOS of F. During the AM and PM peak hour, the LOS at the Montague Expressway/Trade Zone intersection would continue as LOS F. The Calaveras Boulevard closure would add more than 4 seconds of delay to the critical movements on the Montague Expressway during the AM and PM peak. While traffic impacts on Calaveras Boulevard itself during the lane closure period would be less than significant, the impacts to other area roadways would be significant. These impacts would be greater than under the proposed project but would be reduced to less than significant with mitigation (see Section 3.15.6 for mitigation measures).

Los Coches Street would be closed for 60 days to allow construction of a new 100-foot span over the creek. Closure of Los Coches Street would require diversion to alternative routes such as Yosemite Drive. The number of vehicles impacted would be up to 550 during peak hours. The diverted vehicles would be within the capacity of the alternative routes (Kittelson 2012). This would be a less than significant impact.

Construction at or near Yosemite Drive would involve closing one traffic lane for up to 10 days. Traffic would continue to use two lanes in one direction but only one lane in the other direction. This would add delays to traffic on Yosemite Drive but traffic volumes on Yosemite Drive are low enough that diversion to alternative routes would not be required (Kittelson 2012). The impacts would be less than significant.

Construction at or near Ames Avenue would involve closing one traffic lane for up to 10 days. The traffic flow on Ames Avenue could be maintained on the single available lane using construction flaggers during the period of lane closure. A portion of this traffic may use Sinclair Frontage Road and Yosemite Drive as an alternative. The impacts would be less than significant.

Table 5.9 2017 Baseline Turning Movements and Partial Closure of Calaveras Blvd., Alts. 2B and 4								
Intersection	**2017 Base**				**2017 Calaveras Partial Closure**			
	AM Peak		**PM Peak**		**AM Peak**		**PM Peak**	
	LOS	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**
Jacklin Rd. & I-680 Northbound Ramps	N/A		B	16.3	N/A		B	16.3
Jacklin Rd. & I-680 Southbound Ramps	N/A		B+	11.8	N/A		B+	11.8
Calaveras Blvd & I-880 Northbound Ramps	B	13.3	B-	18.1	B	12.5	B	13.9
Calaveras Blvd. & Abel Street	D	40.0	D	46.5	D	39.2	D	44.8
Calaveras Blvd. & Milpitas Blvd.	D	42.5	D	48.8	D	40.0	D	43.0
Great Mall Pkwy. & I-880 Northbound Ramps	C	29.9	C+	21.5	C-	32.8	C-	34.2
Great Mall Pkwy. & Abel Street	D	40.7	D+	35.9	D	40.1	D+	35.8
Montague Exp. & Capitol Blvd.	E+	57.6	E	61.0	F	83.8	E	63.0
Montague Exp. & Milpitas Blvd.	D	50.7	D	43.2	D-	54.6	D	50.6
Montague Exp. & I-680 Northbound Ramps	D	44.7	D-	51.1	D	44.7	D-	51.1
Montague Exp. & Main St./Old Oakland	E-	75.7	E	64.8	F	97.3	F	98.7
Montague Exp. & Trade Zone Blvd.	F	96.3	F	91.9	F*	124.5	F*	114.8

*Level of service would remain at F but with increased duration of delay.

Transit Impacts. Route 47, operating on Calaveras Boulevard, would experience delays due to the partial closure of Calaveras Boulevard. The contractor would coordinate with Santa Clara VTA to identify the schedule of the lane closure and, if necessary, provide for temporary manual traffic control to give priority for transit vehicles through the congested corridor during the construction period. Implementation of this mitigation measure would reduce this temporary impact to less than significant with mitigation. The eastbound bus stop for Route 47 on Calaveras Boulevard east of S. Hillview Drive may need to be relocated slightly east of its existing location depending on the physical length of the lane closure during the 30 days of bridge work. AC Transit Route 217 may also experience some minor, temporary delays in the vicinity of Calaveras Boulevard and S. Hillview Drive during bridge construction.

Diversion of traffic to Great Mall Boulevard and Montague Expressway during the Calaveras Boulevard bridge construction period may impact transit travel times on these roads during the 120 days of bridge work and affect Routes 46, 70, 71, 104, and 180. The contractor would coordinate with Santa Clara VTA to determine the need for temporary manual traffic control to give buses priority. These impacts would

be significant and greater than impacts occurring under the proposed project, but would be reduced to less than significant with incorporation of mitigation measures specified in Section 3.15.6.

Railroad. The UPRR culvert south of Ames Avenue would be reconstructed with a longer span. There would be a temporary disruption of rail service on the spur line during the reconstruction period, similar to the proposed project. Based on an examination of aerial photographs, one business appears to be impacted by the temporary loss of rail service, though up to a dozen properties front the spur line. Significant disruption of rail service to these businesses could be avoided by staging the work to minimize the duration of railroad track closure.

Impacts to Non-Motorized Transit. Closure of travels lanes and sidewalks would affect bicyclists and pedestrians using Calaveras Boulevard during bridge construction. Under Alternative 2B, construction would last 120 days. The sidewalk on the south side of the street would be closed during this period, requiring pedestrians to use the sidewalk on the north side of Calaveras Boulevard. It is important to note that there is no pedestrian crossing of Calaveras Boulevard between S. Hillview Drive on the east and S. Park Victoria Drive, a distance of approximately ½ mile (2,500 feet). Pedestrians traveling from the west side of S. Hillview Drive could access businesses southwest of I-680 via Los Coches Street. The closure of Los Coches Street could be timed so that it does not occur simultaneously with the closure of Calaveras Boulevard traffic lanes.

There are no bicycle lanes on Calaveras Boulevard, though the shoulder lanes are quite wide. During the 120 days of Calaveras Boulevard bridge work, there would be two through lanes and no shoulders in each direction, which could impact bicycle movements through the area. Calaveras Boulevard is not currently a designated bicycle route west of I-680.

Under Alternative 2B, the complete closure of Los Coches Street would temporarily require bicycles and pedestrians to use alternate routes during the 60-day construction period. The pedestrian bridge cantilevered on the south side would need to be reconstructed. The nearest crossing of the creek would be at Yosemite Drive, 3000 feet south. The creek could also be crossed at Calaveras but with limited or no access to destinations west of I-680.

Sidewalks on one side of Ames Avenue and Yosemite Drive may be temporarily closed during bridge construction work as outlined above. The sidewalk on the opposite side of each bridge would still be accessible. Appropriate signage would be provided to guide pedestrians to the alternate crossing, and safety features, possibly including lights or a temporary crosswalk, would be installed to ensure safe passage from one side of the street to the other. Bicycle traffic would be subject to the same traffic detours as with motorized vehicles for the short period of bridge work.

The construction contractor would prepare traffic management plans which include advance notice of street closures so that bicyclists and pedestrians who typically use the creek crossings can identify alternate routes. Implementation of mitigation measures would reduce the temporary impact to less than significant. During the partial lane closures, it would be necessary to close the sidewalk on one side of the street at each location for safety reasons. Pedestrians would need to detour to the sidewalk on the other side of the street. This closure could cause some inconvenience but would not cause significant delay of pedestrian movements. The overall effect of this alternative on non-motorized transportation would be greater than under the proposed project but less than significant with mitigation.

Safety and Emergency Access*.* Measures to ensure safe operation of construction vehicles described under the proposed project would be implemented under this alternative. Emergency response times could be increased by traffic delays associated with lane closures on Calaveras Boulevard, constituting a significant impact. Prior to construction, traffic and transportation management plans would be prepared by the project proponent and construction contractor, as described in Section 3.15.6. Implementing these plans would ensure that emergency vehicles are given priority passage through the construction area and traffic control personnel would be trained to ensure that access by emergency vehicles would be unrestricted to the degree possible. Creating and implementing these plans as described in Section 3.15.6 would reduce this impact to less than significant with mitigation.

UTILITIES AND SERVICE SYSTEMS. This alternatives would have the same potential to encounter VOC-contaminated groundwater at the JCI off-site area as the proposed project. Impacts associated with contaminated groundwater exceeding RWQCB water quality standards would be the same under this alternative as under the proposed project. This impact would be significant, but less than significant after mitigation consisting of treating the contaminated groundwater before discharging it to the creek.

Under this alternative, excavation quantities would increase to 123,464 cubic yards, as compared to 90,000 cubic yards under the proposed project. As shown in Table 3.38, this amount of material would not significantly diminish remaining capacity of most of the landfills that may be accessed during construction. Similarly to the proposed project, if all materials were disposed of at the Zanker Materials Processing Facility or the Zanker Road Resource Recovery Operations Landfill, the remaining capacity of these landfills could be substantially reduced, which would be a significant impact. However, it is unlikely that all of the excavated materials would be disposed of offsite, since many of the materials can likely be reused onsite. Also, these facilities do not accept contaminated wastes, which are likely to comprise a significant portion of the materials that eventually are disposed of in landfills. Considering these factors, it is expected that potential effects related to landfill capacity would be greater than under the proposed project, but would still be less than significant.

WATER RESOURCES. In comparison to the proposed project, Alternative 2B would require more excavation, soil disturbance, and structures, due to greater excavation amounts and increased floodwall lengths, which could provide more opportunity for spills of hazardous materials routinely used in construction. The extra construction would also mean use of more concrete within the channel, with a slightly elevated risk of discharge and violation of water quality standards. However, with the implementation of the mitigation measures specified in Section 3.17.6, construction impacts of Alternative 2B would be greater than for the proposed project, but would still be less than significant.

The risk of impacts to water resources during operations and maintenance would be slightly higher under this alternative than under the proposed project since there would be greater needs associated with maintenance of the longer floodwall, but operational impacts to water resources would still be less than significant.

5.2.2.4. *Alternative 4: Walled Trapezoidal Channel*

Most construction features under Alternative 4 would be similar to features under the proposed project, with the primary differences being the length of floodwalls and degree of excavation. Alternative 4 proposes the construction of floodwalls along nearly the complete length of the project area, for a total of approximately 11,600 feet. The channel, as with all other alternatives, would be graded into an earthen trapezoidal channel section with varying bottom widths. Similar to Alternative 2B, this alternative is designed assuming a bypass structure is in place along a greenbelt reach along Berryessa

Creek upstream of I-680. Alternative 4 also includes vegetated floodplain terraces that would be constructed in Reach 4. Vegetation would be hydroseeded as with all alternatives, and consist of native California grasses.

The SFBRWQCB expressed support for this alternative in a letter to USACE (Lichten, 2015). That letter stated that this alternative would better support beneficial uses of the creek than the proposed project. The letter also stated that Alternative 4 could be modified to include free-span bridges for the railroad crossings at Piedmont and Berryessa creeks. USACE found that installation of free-span bridges would be logistically impracticable because it would result in a lengthy loss of service for weeks to months on the affected rail lines, which is unacceptable to UPRR. In contrast, the proposed box culverts at these railroad crossings would be pre-fabricated and installed within 72 hours, which is acceptable to UPRR (Tetra Tech, 2015f).

Typical sections showing the overall configuration of Alternative 4 are shown in Figure 5.3. The primary features of Alternative 4 are:

- Channel excavation and earthen levee construction to the water surface level of the 95 percent certainty, 0.01 exceedance probability event discharge from I-680 to Calaveras Boulevard (proposed channel dimensions for various reaches are shown in Figure 5-2),
- Cast in place concrete floodwalls along much of the length of the entire project area for a total of approximately 11,600 linear feet on both banks, for a total installation length of 23,200 feet,
- 2H:1V sideslopes with turf reinforcement mats and buried rock revetment for scour protection,
- Two vegetated floodplain benches in Reach 4 only, 32 feet wide on west bank and 10 feet wide on east bank from Montague Expressway upstream to I-680,
- Replacement of UPRR crossings at Piedmont Creek and Berryessa Creek with box culverts,
- Replacement of UPRR culvert with a 60-foot span,
- Shoring of bridge abutments at Ames Avenue and Yosemite Drive to accommodate widened channel,
- Replacement of Los Coches Street Bridge with 100-foot span,
- Replacement of Calaveras Boulevard Bridge with 100-foot span, and
- Utility relocations, as needed.

Bridge and road closure or rerouting details for Alternative 4 are the same as for Alternative 2B.

AESTHETICS. With increasing excavation and floodwalls comes the potential for increasing impacts to visual quality of the project area. Total area of excavation is greater under this alternative, with almost twice as many cubic yards of material removed compared to the proposed project. This larger excavation quantity would result in more total truck trips per day (114) than other alternatives (86 or 61). However, the increase in truck trips would not significantly impact visual quality during construction, since the area is already in an industrialized zone that is aesthetically compromised. Trucks would be present in the area and the visual character of the area would not be impacted by the number of trips made.

Alternative 4 also prescribes the expansion of floodwalls by more than double that of Alternative 2B, and at a length that is over 20,000 feet longer than the proposed project. Despite the already industrialized character of the project area, this nearly complete enclosure of the channel by floodwalls would be a dramatic change to the visual character of Upper Berryessa Creek. Viewer groups observing the channel from outside the channel would be cut off from seeing the channel itself by floodwalls of up

to 3 feet in height, including the associated greenery and water flows, and would instead see only concrete and gravel access roads. This impact would be much more extensive than visual impacts occurring under the proposed project, but would be less than significant since the floodwalls would still be consistent with the highly developed area that surrounds them.

Another visual difference in the design of Alternative 4 is the inclusion of vegetated terraces in Reach 4. Terraces would be created in the channel side slopes, which would expand channel flood capacity, and create a bench that would host native California grasses. Because of the extent of the floodwalls in this alternative, terraces would have no impact on the visual character of the area, except for viewers who are immediately adjacent to floodwalls. Terraces would provide greater visual variety for viewers.

AIR QUALITY. Estimated emissions are shown in Table 5.10, showing that, as with all other alternatives, construction in all reaches under Alternative 4 would exceed local air quality thresholds for NOx; therefore, impacts to air quality would be significant and unavoidable. Emissions would be higher under this alternative than under the proposed project, therefore the intensity of the impact would be greater.

Operation and maintenance activities related to floodwall and culvert maintenance under Alternative 4 would be greater than under the proposed project due to the greater length of the floodwalls, and would result in greater emissions due to more vehicular use. However, increased emissions due to floodwall maintenance are not expected to esceed any air quality thresholds, and would be be less than significant. The proposed project would conform to applicable Federal and State standards, and local thresholds on a long term basis. These impacts would be comparable to those for the proposed project and considered less than significant.

Table 5.10 Modeled Air Quality Emissions (Alternative 4)

Criteria Pollutant	**ROG**	**CO**	**NO_x**	**PM_{10}**	**$PM_{2.5}$**	**CO_2**
Reaches 1-3						
Estimated Daily Emissions	9.0 lbs./day*	48.9 lbs./day*	107.9 lbs./day*	24.7 lbs./day*	8.3 lbs./day*	14,472 lbs./day*
Estimated Project Emissions	<1 ton	4.9 tons	9.5 tons	4.7 tons	<1 ton	1,213 tons
BAAQMD Project Construction Thresholds	54 lbs./day	N/A	54 lbs/day	72 lbs/day	54 lbs/day	N/A
Federal Conformity Rule Thresholds	50 tons/year	100 tons/year	50 tons/year	100 tons/year	N/A	N/A
Criteria Pollutant	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**CO2**
SMAQMD Construction Thresholds for GHGs	N/A	N/A	N/A	N/A	N/A	1,210 tons/year
Exceed Thresholds	No	No	Yes	No	No	Yes
Reach 4						

Estimated Daily Emissions	8.3 lbs./day*	44.5 lbs./day*	90.0 lbs./day*	24.2 lbs./day*	8.0 lbs./day*	10,218 lbs./day*
Estimated Project Emissions	<1 ton	4.5 tons	8.5 tons	2.7 tons	<1 ton	949 tons
Criteria Pollutant	**ROG**	**CO**	**NO_x**	**PM_{10}**	**$PM_{2.5}$**	**CO_2**
BAAQMD Project Construction Thresholds	54 lbs./day	N/A	54 lbs/day	72 lbs/day	54 lbs/day	N/A
Federal Conformity Rule Thresholds	50 tons/year	100 tons/ year	50 tons/year	100 tons/ year	N/A	N/A
Exceed Thresholds	No	No	Yes	No	No	No
ROG=reactive organic gases, NO_x=nitrogen oxides, CO=carbon monoxide, CO_2=carbon dioxide, PM_{10}=particulate matter less than 10 microns. $PM_{2.5}$=particulate matter less than 2.5 microns.*Represents maximum pounds per day, usually during grading/excavation phase.						

BIOLOGICAL RESOURCES. Types of impacts to biological resources under Alternative 4 would be similar to those occurring under the proposed project. This alternative would be consistent with the Santa Clara Valley HCP. The same amount of waters of the U.S. and waters of the State would be impacted during construction, and potential impacts to special status species and migratory birds, would be the same. The same number of trees would be removed as under the proposed project. Similarly to the proposed project, these significant impacts would be reduced to less than significant with implementation of the mitigation measures identified in Section 3.5.6. Impacts to general wildlife species would be more extensive than under the proposed project, due to the presence of floodwalls throughout the entire project area, which would serve as a barrier to smaller wildlife trying to access the channel for foraging or to find water.

Reach 4 segments of the project area would receive vegetated terraces extending upslope from the stream channel. These terraces would be planted with native California vegetation and would provide more suitable habitat than the non-terraced stream banks of the other alternatives. Although the amount of excavation and recontouring required for the additional terraces and lengthened floodwalls increases the overall amount of earthwork, the overall impact of Alternative 4 construction would be comparable to the proposed project. Biological impacts would be significant, but less than significant after mitigation.

CULTURAL RESOURCES. Based on the expected extent of ground disturbance represented by the total soils exported per day, Alternative 4 would have greater potential to impact archaeological resources than the proposed project. Alternative 4 also poses the most disturbance in the vicinity of archaeological site CA-SCL-593, as a result of the construction of floodwalls and terraces through the site. Though the potential for unintended damage of the site is highest under this alternative, it is the purpose of the mitigation measures to ensure protection of cultural resources. With appropriate application of mitigation measures, this alternative is expected to result in a less than significant impact to cultural resources, although potential for impacts is greater than under the proposed project.

GEOLOGY, SOILS AND MINERALS. Because Alternative 4 would have greater excavation quantities and longer floodwalls than under the proposed project, it would have greater impacts related to erosion or

ground shaking as the proposed project. These impacts would be significant, but less than significant after mitigation.

GREENHOUSE GAS EMISSIONS. Table 5.10 summarizes CO2 emissions from activities undertaken during construction. Emissions under this alternative are estimated to be 1,213 tons in Reaches 1-3, and 949 tons in Reach 4, which are greater than under the proposed project. The combined total of GHGs from Alternative 4 would exceed SMAQMD's significance threshold (1,210 T/yr) for annual GHG emissions. With mitigation, Alternative 4 GHG emissions would decrease by up to 20% but would still exceed SMAQMD significance thresholds. GHG emissions would be significant and unavoidable.

HAZARDOUS WASTES. Overall, the extent of excavation, soil disturbance, and construction would be greater than under the proposed project, with similar corresponding opportunity for spills of hazardous materials routinely used in construction, and for risk to workers from increased exposure to potential VOC contamination from the JCI and Great Western plumes. However, taking these potential risks into account, and assuming the mitigation measures proposed in Section 3.9.6 are implemented, the associated risks to workers and the public would be greater than under the proposed project, but less than significant with mitigation. Potential impacts to emergency access or evacuation plans would be the same as for the proposed project.

LAND USE AND PLANNING. Alternative 4 would occur within the same area as the proposed project and would therefore have impacts on land use and planning similar to the proposed project. A continuous recreational trail proposed as part of Milpitas' Trails Master Plan would be less viable under this alternative than under the proposed project. Under this alternative Berryessa creek would be widened and this may preclude construction of creek access roads that could accommodate a future trail open to public use. At the very least, implementation of this alternative would require costly construction of a footbridges at these locations to allow the proposed trail to cross these creeks. This alternative would result in a conflict with the Milpitas Trails Master Plan (as would the proposed project) which would be a significant impact.

NOISE. The types and duration of construction noise under Alternative 4 would be the same as the proposed project, but the potential noise levels could be higher due to an increase in truck trips, additional use of excavators and scrapers needed for increased excavation work, and bridge and culvert replacements. With the implementation of mitigation measures identified in Section 3.11.6 noise impacts would be greater than those for the proposed project, but most noise impacts would still be less than significant overall. However, noise impacts associated with replacement of the UPRR trestle and the UPRR culvert would occur outside of Milpitas' allowable construction times of 7:00 am to 7:00 pm over the course of a 72-hour period, and would be significant and unavoidable. In addition, the temporary increase in ambient noise during construction of this alternative would also likely be significant, as is the case for the proposed project.

Ongoing maintenance of the stream channel would require similar actions as under the proposed project, but may require additional visits over the course of any given year, due to the increased number of features requiring maintenance. If additional maintenance trips are necessary, the number of trips would not be substantial enough to increase noise impacts from current levels.

POPULATION AND HOUSING. Impacts from Alternative 4 to population and housing would be similar to those of the proposed project, and would be less than significant. The presence of increased floodwalls or terraced banks would not result in increased impacts to population or housing.

PUBLIC SERVICES. Like the proposed project, this alternative would not result in increased need for public services, or make a public service unavailable, therefore there would be no impact associated with these criteria. Potential impacts associated with emergency services would be greater than under the proposed project since lane closures on Calaveras Boulevard would increase response times for emergency vehicles. Although this impact would be greater than under the proposed project, mitigation measures described in Section 3.15.6 would reduce this impact to less than significant.

RECREATION. Impacts related to recreation from Alternative 4 will be similar to those of the proposed project. The pocket park would be removed, resulting in the loss of recreational opportunities at this location. This impact would be less than significant because there are other recreational facilities in the vicinity that can provide similar services. Because this alternative would lack the installation of culverts at Los Coches Creek and Piedmont Creek that would be included as part of the proposed project, a continuous recreational trail proposed as part of Milpitas' Trails Master Plan would be less viable under this alternative. However, implementation of this alternative would not prevent the city from constructing footbridges at these locations or implementing other measures to allow the proposed trail to cross these creeks, therefore the impact upon recreation is less than significant.

TRAFFIC AND TRANSPORTATION. Traffic analysis presented for Alternative 2B pertains to this alternative, as partial closure of Calaveras Boulevard would occur under both Alternative 2B and Alternative 4. In general, the types of effects to traffic and transportation would be the same as under the proposed project, but would be much more extensive. Truck trips per day would increase to 114 (approximately twelve per hour), and closures of lanes on Calaveras Boulevard, Los Coches Street, Yosemite Drive, and Ames Avenue would increase travel times and emergency response in Reaches 1 and 2. With implementation of mitigation measures identified in Section 3.15.6, these impacts would still be greater than under the proposed project but would be reduced to less than significant. Operations and maintenance impacts would also be similar, still resulting in a less than significant effect.

UTILITIES AND SERVICE SYSTEMS. Impacts associated with contaminated groundwater exceeding RWQCB water quality standards would be the same under this alternative as under the proposed project. This impact would be significant, but less than significant after mitigation.

WATER RESOURCES. Overall, the extent of excavation, soil disturbance, and construction would be greater than all other alternatives, with similarly increasing opportunity for spills of hazardous materials routinely used in construction, accidental discharges associated with use of concrete, and sediment input due to erosion. However, taking these factors into consideration, with the implementation of the mitigation measures identified in Section 3.17.6, construction impacts of Alternative 4 would be less than significant and comparable to the proposed project.

As with other action alternatives, Alternative 4 would result in fewer potential impacts from operations and maintenance, since less operation and maintenance would be needed under post-project conditions. In comparison to the proposed project, there would not be a greater potential for water quality impacts resulting from the incremental increase in operations and maintenance needs. The presence of terraced vegetated banks would improve water quality through wetland filtration.

5.2.3. Comparison of Alternatives

Table 5.5 presents a comparison of the environmental impacts of the proposed project with the impacts of each of the 4 alternatives that were carried through the analysis of impacts presented in the previous sections.

No Project Alternative

In the absence of flooding, the No Project Alternative would avoid significant construction-related impacts related to air quality, biological resources, cultural resources, geology and soils, hazardous materials and wastes, noise, traffic and transportation, utilities and service systems, and hydrology and water quality that would result from the proposed project. However, implementing mitigation measures identified in this EIR would decrease all of the significant impacts of the proposed project to less than significant with mitigation, with the exception of air quality, greenhouse gas emissions, and noise. The No Project alternative would avoid those significant impacts.

However, without implementation of the proposed project, flooding would likely occur on regular intervals between 5 and 10 years, resulting in impacts including economic damages; traffic congestion; damage to homes, businesses, and public infrastructure; increased demand on emergency service providers and corresponding emergency response times; temporary increases in criteria gas emissions and noise due to use of heavy equipment; increased erosion and sedimentation; damage to utilities; and temporary impacts to biological resources. The proposed project would prevent overbank flows up to the 100-year event, and the flood-related environmental impacts described above would not result. The No Project Alternative would not meet any of the project objectives.

Alternative 2A: USACE Selected Plan

Alternative 2A would result in similar significant impacts as the proposed project. Significant impacts in the areas of biological resources, cultural resources, geology and soils, hazardous materials and wastes, traffic and transportation, utilities and service systems, and hydrology and water quality would be the same as for the proposed project, and would be mitigated to less than significant through application of mitigation measures contained in this EIR. Alternative 2A, like the proposed project, would result in significant, unavoidable impacts to air quality, greenhouse gases, and noise, but these impacts would be slightly less than for the proposed project.

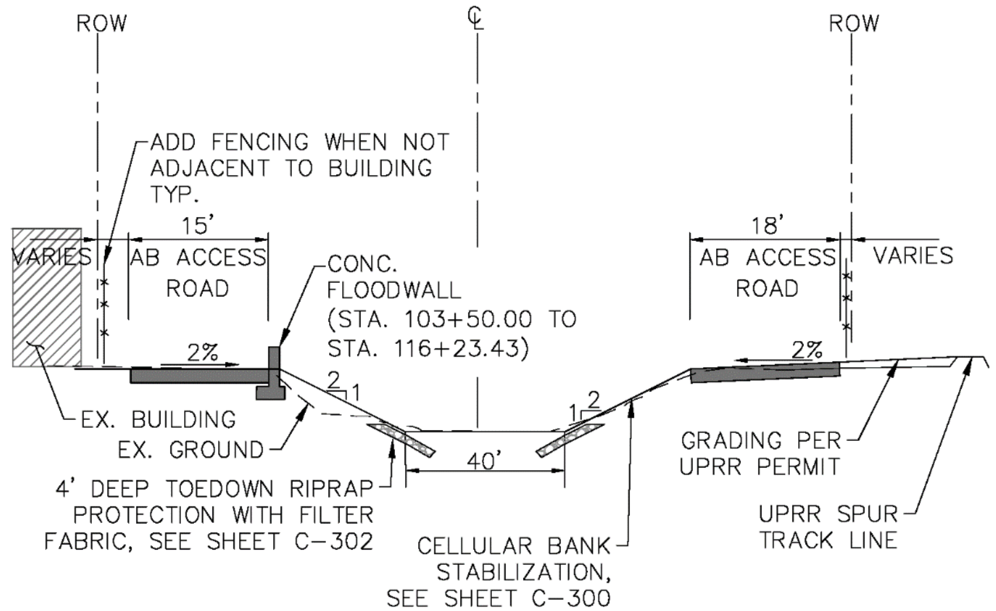
Alternative 2A would meet project objectives other than Objective ~~2~~1: Achieving FEMA certification requirements for containing the 100-year flood event in all reaches. Flood protection in Reaches 1 and 4 would meet FEMA requirements, but parts of Reaches 2 and 3 would be short of meeting FEMA requirements, due to the lower floodwall. In contrast, the proposed project would fully meet all project objectives.

Alternative 2B: Expanded Incised Trapezoidal Channel

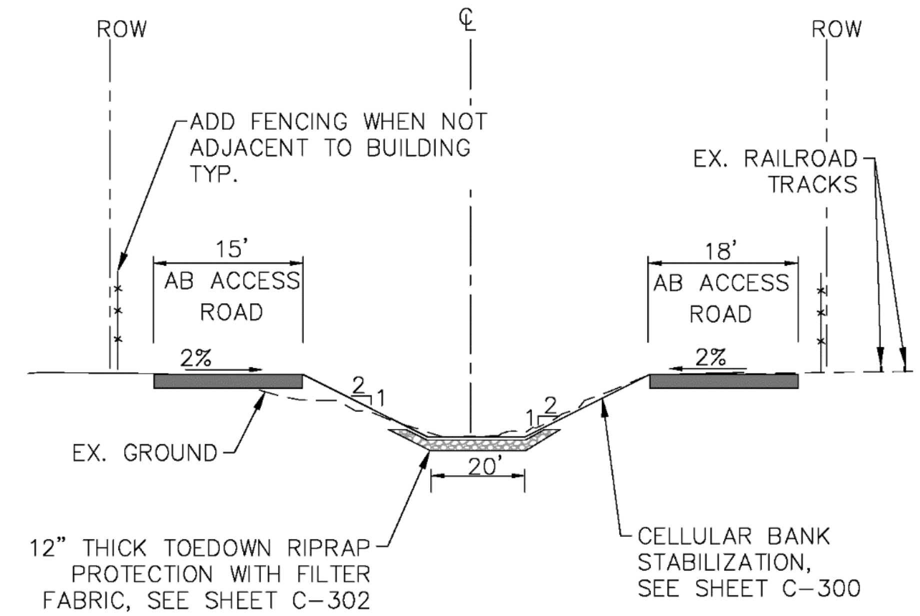
Alternative 2B would have a slightly larger footprint than the proposed project, and although most of the construction actions would be similar, they would also be more extensive. This alternative would not avoid any of the significant impacts that would occur under the proposed project. Because Alternative 2B would require greater excavation than the proposed project, it would result in greater construction period impacts than the proposed project to air quality, biological resources, cultural resources, geology and soils, hazardous materials, noise, hydrology, traffic and transportation, and water quality. Alternative 2B would also require more bridge modification and lane closures than the proposed project, resulting in increased impacts to traffic and transportation and emergency access. Because of

the increased excavation area and quantities, this alternative would have a greater number of truck trips and additional disposal of construction debris, greater potential to encounter unknown archaeological resources or human remains, and additional impacts to visual resources due to the extended floodwall. It would also have greater potential for significant traffic impacts, due to partial closure of the Calaveras Boulevard Bridge and full closure of the Los Coches Bridge, both for up to 120 days to allow for replacement of those structures. Although these traffic impacts would be less than significant with mitigation, they would still be considerably more extensive than traffic impacts that would occur under the proposed project. Alternative 2B would also result in greater emissions of GHGs during construction than the proposed project, although emissions from both alternatives would exceed the significance threshold established by SMAQMD. This alternative would provide increased areas for planting of native vegetation and in the long term would result in increased riparian habitat in the creek channel relative to the proposed project.

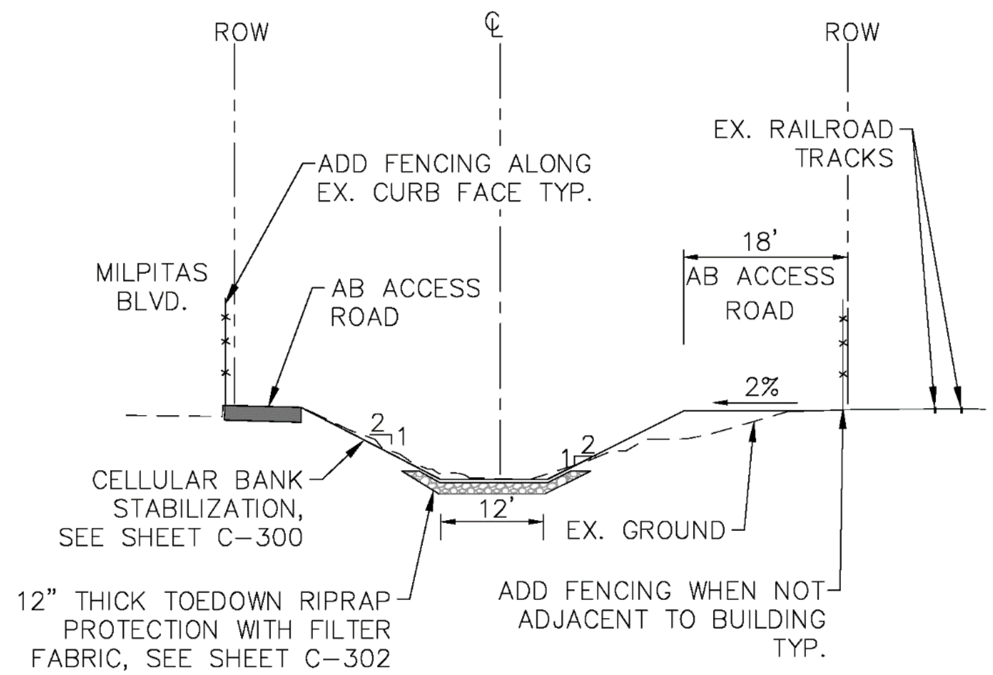
As would be the case for the proposed project, all impacts would be mitigated to less than significant levels, except construction period emissions of NO_x, temporary construction noise levels, and greenhouse gas emissions, which would be significant and unavoidable. Although this alternative was designed to accommodate an upstream bypass, there are currently no plans to construct this bypass, therefore this alternative does not offer a functional benefit over the proposed project. Alternative 2B would fully meet all project objectives, except Objective 3. Alternative 2B includes a much larger channel than the USACE-selected plan and would require reconstruction of existing Calaveras Boulevard and Los Coches Street bridges. The USACE-selected plan does not include revisions to these bridges. The USACE GRR/EIS estimates that the cost to implement Alternative 2B ~~is also expected to~~ would be more than twice that of the proposed project (USACE, 2014). Alternative 2B would conflict with the USACE-selected plan and would not meet Project Objective 3.



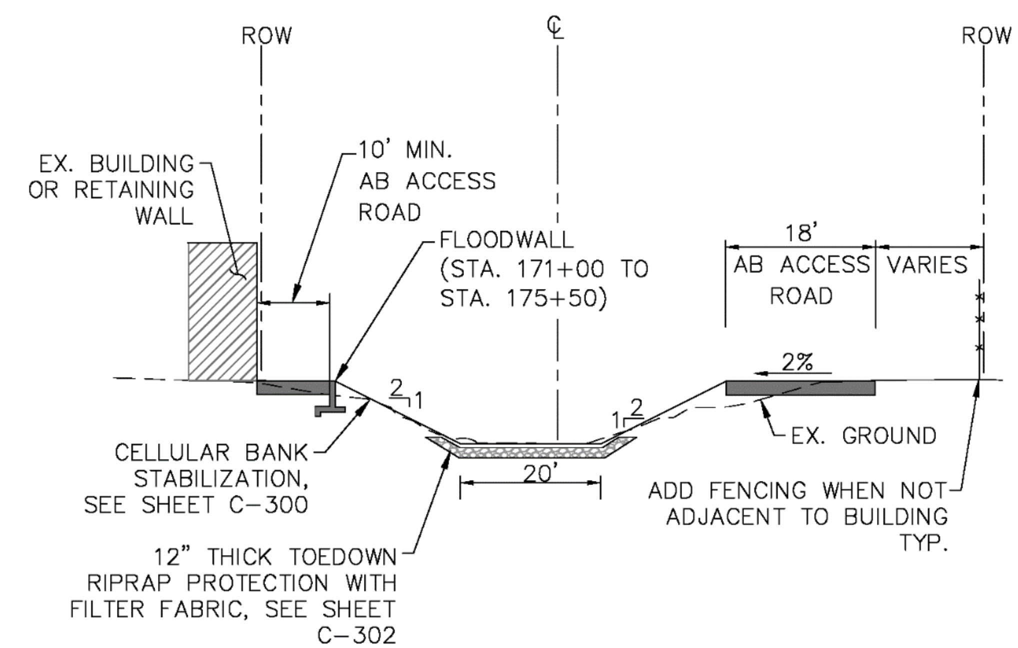
Typical section between Calaveras Boulevard and Piedmont Creek



Typical section between Yosemite Drive and Montague Expressway



Typical section between Piedmont Creek and Yosemite Drive



Typical section south of Montague Expressway

Figure 5.1 Alternative 2A Typical Sections

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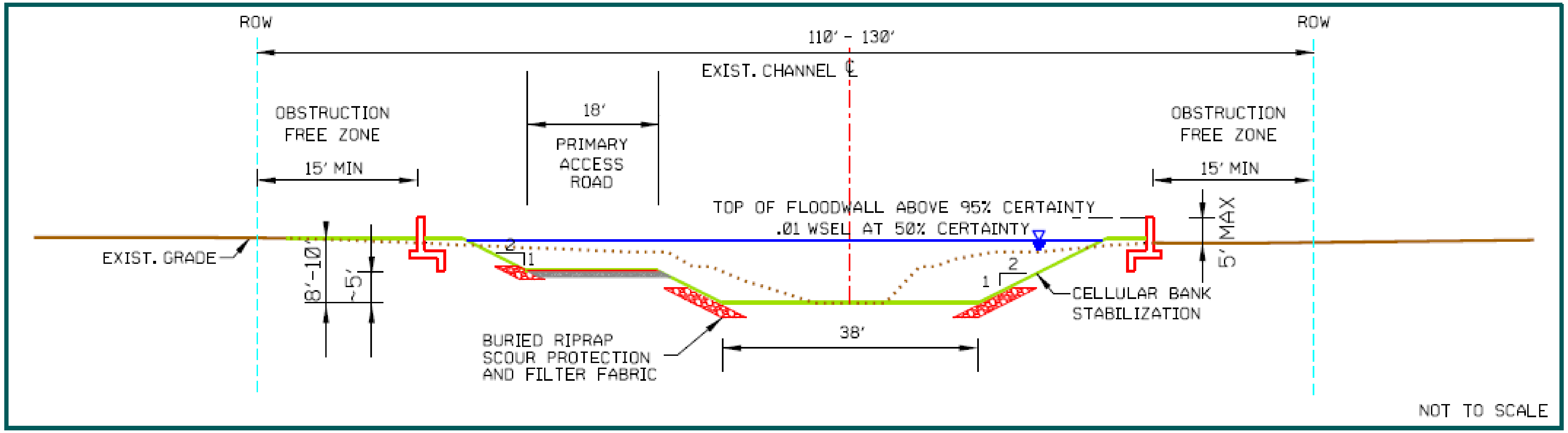
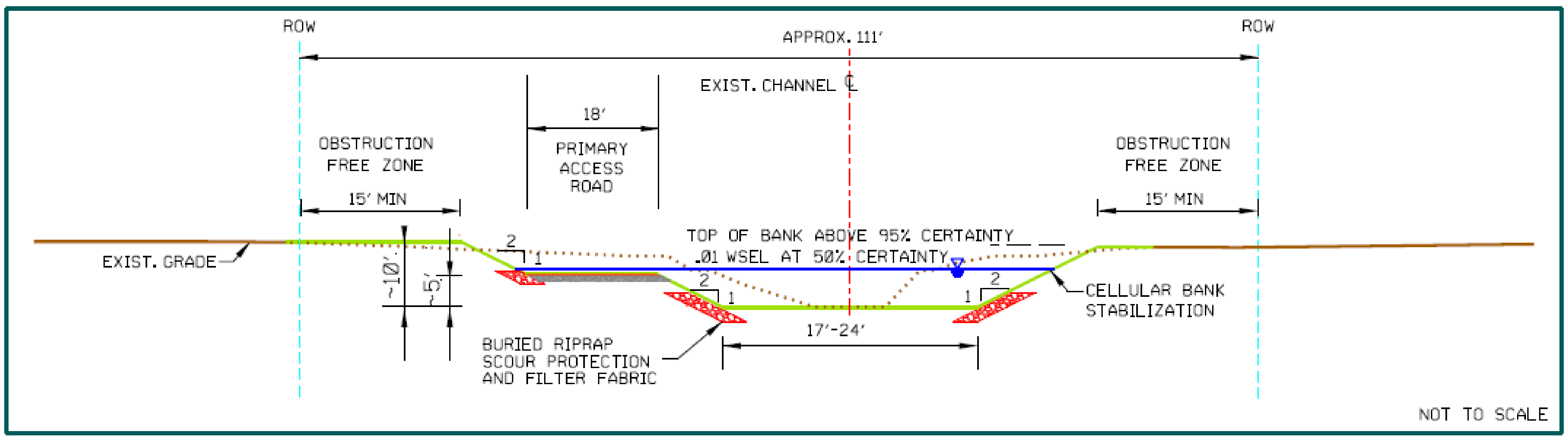


TYPICAL CROSS SECTION, CALAVERAS BLVD TO YOSEMITE DR (STA 130 TO 170)



TYPICAL CROSS SECTION, YOSEMITE DR TO MILPITAS BLVD (STA 170 TO 195)

Figure 5.2 Alternative 2B Typical Sections

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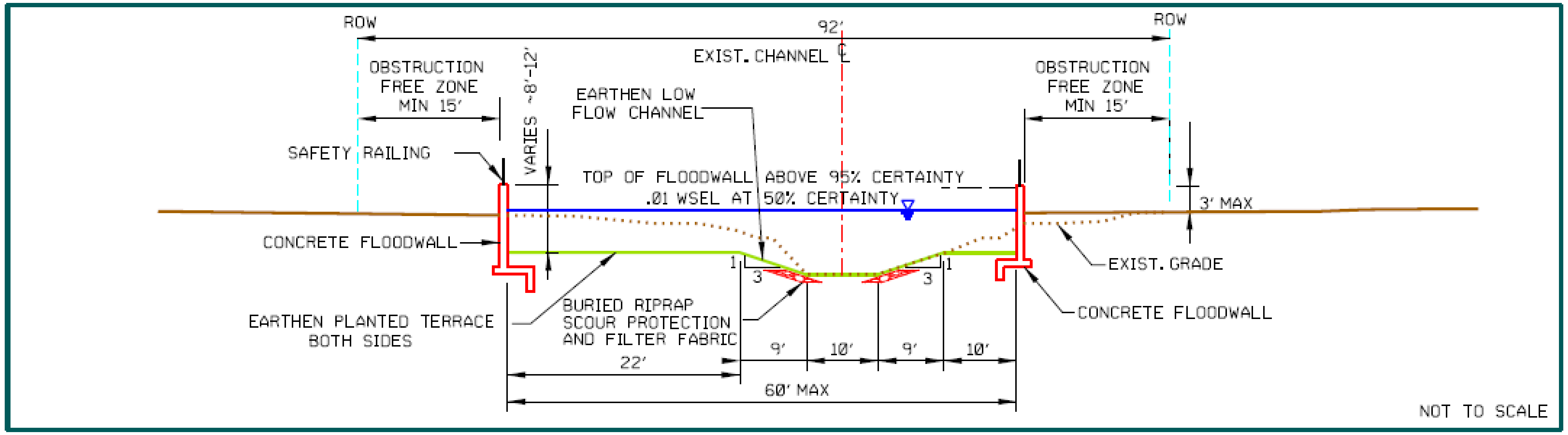
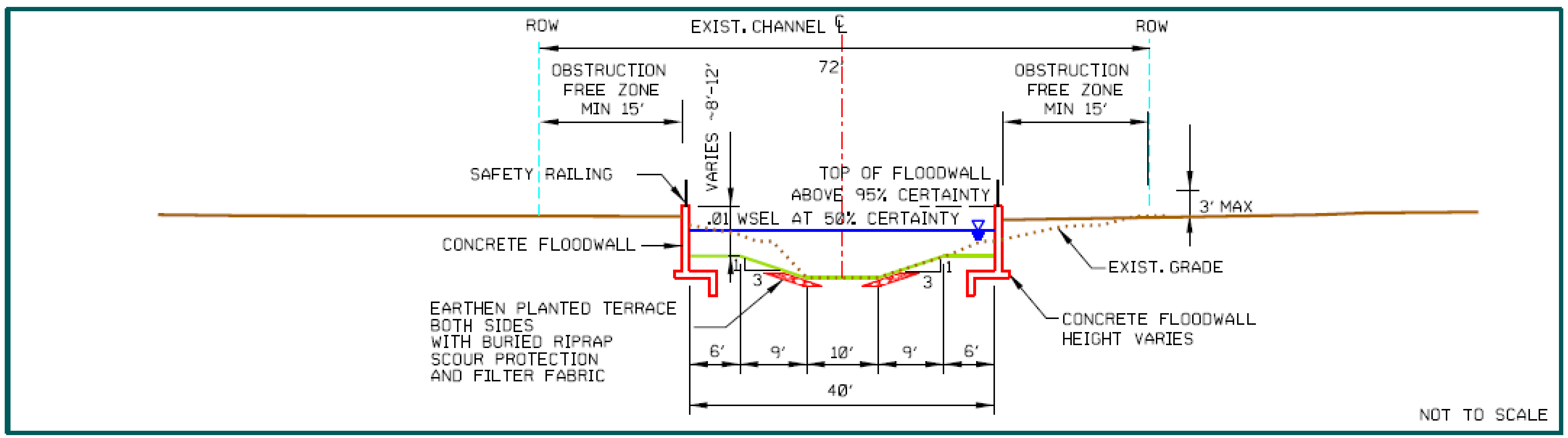


TYPICAL CROSS SECTION, MILPITAS BLVD TO LAKEWOOD CT (STA 195 TO 230)



TYPICAL CROSS SECTION LAKEWOOD CT TO I–680 (STA 230 TO 248)

Figure 5.3 Alternative 4 Typical Sections

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5.2.3.1. *Alternative 4: Walled Trapezoidal Channel*

Under Alternative 4, floodwalls would be located on both banks of the channel through the entire project area, resulting in substantially more impacts to visual resources than the proposed project. The floodwalls would form a low barrier between the overbank area and the channel, which would be a barrier for smaller wildlife such as skunks, mice, and possums that may enter the channel to forage or find water. This effect is not expected to impact special status species. Alternative 4 would not avoid any of the significant impacts that would occur under the proposed project, but would create in-channel riparian habitat which the proposed project would not. This project feature would provide increased habitat for wildlife of the area, an environmentally beneficial feature, although special status species would not benefit because they do not occur at the project area.

Because Alternative 4 would require greater excavation than the proposed project, it would result in greater impacts than the proposed project to air quality, biological resources, cultural resources, geology and soils, hazardous materials, noise, hydrology, traffic and transportation, and water quality. Alternative 2B would also require more bridge modification and lane closures than the proposed project, resulted in increased impacts to traffic and transportation and emergency access. Because of the increased excavation area and quantities, this alternative would have a greater number of truck trips and additional disposal of construction debris, greater potential to encounter unknown archaeological resources or human remains, and additional impacts to visual resources due to the extended floodwall. It would also have greater potential for significant traffic impacts, due to partial closure of the Calaveras Boulevard Bridge and full closure of the Los Coches Bridge, both for up to 120 days, to allow for replacement of those structures. Although these traffic impacts would be less than significant with mitigation, they would still be considerably more extensive than transportation and traffic impacts that would result from the proposed project. Alternative 4 would also result in greater emissions of GHGs during construction than the proposed project, although emissions from both alternatives would exceed the significance threshold established by SMAQMD.

As would be the case for the proposed project, all impacts could be mitigated to less than significant levels, except construction period emissions of NO_x, temporary noise levels, and greenhouse gas emissions, which would be significant and unavoidable.

Alternative 4 would meet all project objectives, except Objective 3. This alternative would construct a walled trapezoidal channel which is fundamentally different from the incised channel included in the USACE-selected plan. The USACE GRR/EIS estimates that the cost to implement Alternative 4 ~~is also expected to~~would be over triple that of the proposed project (USACE, 2014). Alternative 4 conflicts with the USACE-selected plan and would not meet Project Objective 3.

5.2.4. **Environmentally Superior Alternative**

CEQA guidelines in Section 15126.6(e)(2) require that an EIR identify an “environmentally superior alternative.” The guidelines go on to state that if the No Project Alternative is the environmentally superior alternative, then the EIR must also identify an environmentally sensitive alternative from among the build alternatives.

The No Project Alternative would avoid many of the environmental effects of the build alternatives but would not meet project objectives.

The four build alternatives under consideration each have a combination of adverse and beneficial effects on the environment. As shown in Table 5.5, significant unavoidable adverse effects to air quality, greenhouse gases, and temporary noise levels were determined for all four build alternatives. In this instance, the types of effects were the same across the alternatives, with the primary difference occurring in the magnitude of emissions of criteria pollutants and greenhouse gases during construction. Alternatives 2B and 4 would have greater impacts to air quality, greenhouse gases, and construction noise than the proposed project or Alternative 2A. Alternatives 2A, 2B and 4 would also result in a significant impact (LND-1) that could be mitigated to less than significant as is the case for the proposed project.

Alternatives 2B and 4 would result in greater significant impacts than either the proposed project or Alternative 2A in the areas of air quality, cultural resources, geology and soils, GHG emissions, hazardous wastes and materials, noise, transportation and traffic, utility services, and hydrology and water quality. Alternatives 2B and 4 would also result in greater impacts to visual quality and public services than the proposed project or Alternative 2A, although these impacts would not be significant for any of the alternatives. Alternatives 2B and 4 would have greater construction period impacts to biological resources than the proposed project or Alternative 2A. These alternatives would also result in long-term effects due to inclusion of floodwalls that would be a barrier to wildlife movement. Alternative 4 would offset these impacts by creating riparian habitat on in-channel terraces, a beneficial impact to biological resources. Overall, Alternatives 2B and 4 would result in substantially greater environmental impacts than either the proposed project or Alternative 2A.

The proposed project and Alternative 2A would have very similar impacts. They would both result in significant impacts in the areas of air quality, biological resources, cultural resources, geology and soils, hazardous wastes and materials, noise, transportation and traffic, utilities and service systems, and hydrology and water quality. For both the proposed project and Alternative 2A, all significant impacts, except for impacts to air quality, noise, and greenhouse gases, would be reduced to less than significant through application of mitigation measures contained in this FEIR. Alternative 2A would not avoid any of the significant impacts of the proposed project and would not result in any significant impacts not associated with the proposed project. Both the proposed project and Alternative 2A would meet Objectives 2 and 3. However, the proposed project would meet Objective 1 by providing flood protection meeting FEMA certification standards in all 4 project reaches, while Alternative 2A would not meet FEMA certification standards. The proposed project is the alternative that fully meets the project objectives with the least environmental impacts; therefore it is the environmentally superior alternative.

No feasible alternative has been identified that would meet the basic project objectives but reduce the proposed project's significant impacts to less than significant levels. The design of the proposed project already incorporates environmentally sustainable design practices. Further, any build alternative that could achieve most of the proposed project's flood protection objectives would have significant construction impacts similar in type to those of the proposed project.

6. OTHER STATUTORY CONSIDERATIONS

6.1. GROWTH INDUCING IMPACTS

Guidelines under CEQA (15126.2(d)) require that an EIR evaluate the growth-inducing impacts of a proposed project. A project may have direct or indirect growth-inducement potential, meaning the implementation of the project could result in the increased capacity of the area of support new neighborhoods or businesses. An example of a direct growth-inducement might be the construction of new housing. Growth inducement may result from projects that increase capacity for housing, such as expansion of public services or utilities.

The proposed project provides for increased flood protection to the Cities of Milpitas and San Jose. For residents and businesses already located in the flood zone, the additional protection would provide reduced risks to health and safety, improved home valuation, and reduced costs for protection and mitigation of flood events. A potential indirect effect is that the reduced risk of flooding could induce growth and housing demand in the area. However, most areas immediately surrounding the channel are zoned for industrial or commercial uses and would not be available for residential development. Additionally, commercial and residential areas surrounding the channel are already at or near maximum build-out, meaning that finding areas for new construction or higher density uses would be difficult. Therefore, the proposed project would not indirectly induce growth by providing increased levels of flood protection, and this impact would be less than significant.

The project would not result in an increase in the number of temporary or permanent residents in the project area or surrounding vicinity. The project does not include the construction of new housing or business structures that would result in direct growth. Temporary growth would not result during construction, as workers would be drawn from the existing Milpitas, San Jose, or surrounding populations.

Growth is not necessarily positive or detrimental to a community. The Cities of Milpitas and San Jose carefully guide development patterns through the establishment of growth policies that require the orderly expansion of urban development supported by adequate urban public services. Furthermore, the Cities of Milpitas and San Jose are predominantly built out and the proposed project would not change the current land uses within either city.

The construction and operation of the proposed project is not anticipated to result in either direct or indirect growth-inducement.

6.2. UNAVOIDABLE SIGNIFICANT EFFECTS OF SELECTED ALTERNATIVE

As presented in Chapter 3, the proposed project would result in the following significant, unavoidable impacts:

1) Construction-period NOx emissions would exceed local significance thresholds and cause significant, unavoidable impacts associated with Impact Air-2 (violate an air quality standard or contribute substantially to an air quality violation) and AIR-3 (result in a cumulatively considerable increase in a non-attainment pollutant).
2) Noise impacts would be significant after mitigation because construction activities associated with installation of the UPRR trestle <u>and operation of generators powering the dewatering and groundwater treatment system at the Jones Chemical groundwater plume area</u> would occur

outside of allowable construction windows specified in the City of Milpitas Noise Ordinance, and cause a significant, unavoidable impact associated with Impact NOI-1 (Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standard of other agencies).

3) Greenhouse gas emissions would exceed significance thresholds established by the SMAQMD and cause a significant, unavoidable impact associated with GHG-1 (Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment).

6.3. SIGNIFICANT IRREVERSIBLE ENVIRONMENTAL CHANGES

CEQA Guidelines (Section 15126) require a discussion of the significant irreversible environmental changes which would be involved in a project should it be implemented. The irreversible and irretrievable commitment of resources is the permanent loss of resources for future or alternative purposes. Irreversible and irretrievable resources are those that cannot be recovered or recycled or those that are consumed or reduced to unrecoverable forms. The proposed project would result in the irreversible and irretrievable commitment of energy and material resources during construction and operation, including the following:

- Construction materials, including such resources as soil, rocks, wood, concrete, and steel; and
- Energy expended in the form of electricity, gasoline, diesel fuel, and oil for equipment and transportation vehicles that would be needed for project construction and operation.

The use of these nonrenewable resources would not account for a significant portion of the region's resources and would not affect the availability of these resources for other needs within the region. Construction activities would not result in inefficient use of energy or natural resources. Long-term project operation would not result in substantial long-term consumption of energy and natural resources.

7. PUBLIC COMMENTS ON THE DEIR AND DISTRICT RESPONSES

7.1 INTRODUCTION

Pursuant to the California Environmental Quality Act, the District, as the Lead Agency for the proposed project, prepared a DEIR to evaluate environmental impacts of the proposed project. The District released the DEIR for public and agency review on September 25, 2015 (SCH# 2001104013). The public review and comment period closed on November 12, 2015, a period of 49 days. The DEIR was distributed for review and comment to the State Clearinghouse, Santa Clara County Clerk-Recorder's Office, regulatory agencies, and interested members of the public. The District received comment letters from Santa Clara County Parks and Recreation Department, Caltrans District 4, San Francisco Bay Regional Water Quality Control Board (RWQCB), and Valley Transportation Administration during the comment period. The Citizens Committee to Complete the Refuge (CCCR) contacted the District prior to the end of the comment period and requested leave to submit a late comment letter, which the District granted. On November 30, 2015, CCCR and Santa Clara Valley Audubon Society submitted a late joint comment letter, which the District accepted.

The DEIR for the proposed project together with these responses to comments on the DEIR constitutes the FEIR for the proposed project. The FEIR is an informational document prepared by the Lead Agency (in this case the District) that must be considered by decision-makers before approving the proposed project and must reflect the Lead Agency's independent judgement and analysis of the significant environmental effects of the proposed project on the environment (CEQA Guidelines Section 15090). CEQA Guidelines Section 15132 specifies the following:

"The final EIR shall consist of:
(a) The Draft EIR or a revision of the draft.
(b) Comments and recommendations received on the Draft EIR either verbatim or in a summary.
(c) A list of persons, organizations, and public agencies commenting on the DEIR.
(d) The responses of the Lead Agency to significant environmental points raised in the review and consultation process.
(e) Any other information added by the Lead Agency."

This document has been prepared according to these guidelines. This Responses to Comments section reproduces the written comments from public agencies and the general public and also contains the District's responses to those comments. This chapter has been added in its entirety to the DEIR.

7.2. AGENCIES AND ORGANIZATIONS COMMENTING ON THE DRAFT EIR

Table 7.1 lists all agencies and organizations that submitted written comments on the DEIR during the public review and comment period as well as the receipt date of each comment letter or email. No verbal comments were received. All comment letters appear in Appendix G.

Table 7.1 Agencies and Organizations Submitting Comments

Letter Number	Agency or Organization/Signatory	Date Received
1	Santa Clara County Parks and Recreation Department/ Will Fourt, Park Planner III	10/2/2015

2	California Department of Transportation (Caltrans)/ Patricia Maurice, District Branch Chief	11/10/2015
3	San Francisco Bay Regional Water Quality Control Board/ William B. Hurley, Senior Engineer	11/12/2015
4	Roy Molseed, Valley Transportation Authority	11/13/2015
5	Citizens Committee to Complete the Refuge and Santa Clara Valley Audubon Society/Eileen McLaughlin and Shani Kleinhaus	11/30/2015

7.3. WRITTEN COMMENTS AND DISTRICT RESPONSES ON THE DRAFT EIR

This section contains the individual comments, identified by submitter, followed by the District's response to each comment.

Comment 1-1 (Santa Clara County Parks and Recreation): Land Use and Planning (Section 3.10)
As described on page 3-128 of the DEIR, the entire length of the project area is a planned multiple-use recreational trail alignment (Berryessa Creek Trail) as adopted by the City of Milpitas in the Milpitas Trails Master Plan (1997), Bikeway Master Plan Update (2009), and the General Plan. A multiple-use trail along this creek corridor is also consistent with the goals and policies of the Santa Clara Countywide Trails Master Plan (1995) which includes goals and policies for multi-agency collaboration for implementation of trail projects of regional significance, such as the Berryessa Creek Trail.

The project description does not include recreational trail improvements along the creek channel. Because of the project's lack of a trail component, as described on page 3-129, "the proposed project would conflict with the Milpitas Trails Master Plan, which would be a significant impact." To mitigate this impact, Mitigation Measure LND-A would require that the District work with the City of Milpitas to allow public trail access through a Joint Use Agreement.

For the purposes of regional trail planning, and establishing an interconnected regional multi-use trail system, it is important to consider the development of the proposed trail alignment in the future.

Response 1-1
Comment 1-1 does not raise an issue with respect to adequacy of the DEIR. Nonetheless, the following response is provided. Congress authorized the Coyote and Berryessa Creeks Flood Control Project pursuant to Section 101(a)(5) of the Water Resources Development Act (WRDA) of 1990. After the USACE prepared the Berryessa Creek Integrated GRR and EIS which was finalized in 2014, the USACE selected a Berryessa Creek Flood Risk Management Project plan. The District has determined that partnering with USACE to implement the Congress-authorized project would further the flood protection mission of the District. Lead agencies have broad discretion under CEQA to define objectives for proposed projects, and for the proposed project, the District has determined that the objectives would be to implement a project that is consistent with the Congress-authorized project and to provide flood protection along the study reach in Upper Berryessa Creek to meet FEMA certification standards. Development or improvement of trails is not one of the objectives of implementing the project; thus the project description does not include trail improvements along the creek channel.

In analyzing Impact LND-2 (Conflict with applicable land use plan or policy), the EIR describes on page 3-129 that the proposed access roads in Reaches 1 through 3 would accommodate most of the planned trail included in the City's Milpitas Trails Master Plan. However, because the proposed project would

include fencing and locked gates at the entrances to the creek access road from the paved streets, public access to the creek right of way would not be permissible in the event that a trail is built in the future. Accordingly, the EIR concludes Impact LND-2 to be significant and proposes Mitigation Measure LND-A to address this impact through execution of a joint use agreement with the City to allow public access. This mitigation measure is sufficient to reduce the impact to a level of less-than-significant.

When planning for future projects, the District will continue to consult and work with the County and cities and if a District project could accommodate future or improve existing recreational facilities, the District would consider incorporating such elements in the project. This determination would have to be made on a project-by-project basis considering many factors including project objectives, feasibility, and schedule.

Comment 2-1 (California Department of Transportation): Figures, Floodwall Cross-Sections (Chapters 2 and 5)
Floodwall Cross Sections: Please clarify whether the corresponding floodwall typical cross sections have been updated to include the new wall extension. The original proposed floodwall will be extended from 1,300 feet (-ft) to 2200-ft along the west bank in Reaches 2 and 3 with a wall extension from "roughly the Piedmont Creek confluence to 1,500 feet upstream of Los Coches street". Figures 5.1, 5.2 and 5.3 show the original typical cross sections for alternatives 2A, 2B and 4. Figure 2.7 .shows the typical cross sections for the revised project. It appears both Figures 2.7 and 5.1 show the same floodwall limits unchanged from stations 103+50 to 116+23.43 (1273-ft).

Response 2-1
Please note that this comment does not raise an issue related to the adequacy of the EIR impact analysis. Nevertheless, the following response is provided.

Figure 5.1 shows representative cross sections of Alternative 2A, which is USACE's selected alternative plan. The proposed project design is identical to Alternative 2A except that in Reaches 2/3 the proposed project includes a longer and taller concrete floodwall (approximately 2,200 feet long and up to 2 feet tall) than Alternative 2A. Under Alternative 2A the floodwall would be approximately 1,300 feet long and 1.5 feet high. Figure 2.7 has been revised and renumbered as Figure 2.8, and now contains a cross-section showing the proposed project floodwall.

Comment 2-2 (California Department of Transportation): Figures, Floodwall Cross-Sections (Chapters 2 and 5)
Figures 2.7 and 5.1: Please clarify why the 450-ft second floodwall in Reach 4 (171+00 to 175+50) was shown on Figure 5.1 (Alternative 2A sections, south of Montague Expressway) but not on the revised typical cross sections of Figure 2.7.

Response 2-2
Please note that this comment does not raise an issue related to the adequacy of the EIR impact analysis. Nonetheless, the following response is provided.

The Reach 4 floodwall was inadvertently omitted from Figure 2.7 in the Draft EIR. Figure 2.7 (now Figure 2.8 in the Final EIR) has been revised to include the buried floodwall in Reach 4.

Comment 2-3 (California Department of Transportation): FEMA Flood Map (Chapter 2)

Federal Emergency Management Agency (FEMA) Flood Map: The DEIR states that the proposed project would remove an estimated 500 parcels of land from the flood hazard zone. Caltrans recommends that the FEMA flood map be included in the DEIR with an exhibit showing the approximate areas where the flood hazard will be lifted.

Response 2-3
Figure 2.4 shows the areas that would be flooded during the 100-year event under current creek conditions (i.e., without implementation of the proposed project). The 100-year flood zone shown in Figure 2.4 is based on modeling conducted during preparation of the USACE's Feasibility Study/GRR and differs somewhat from the FEMA flood hazard areas because of the availability of more recent hydrology and modeling results. Figure 2.5 (a new figure included in the Final EIR) shows the existing FEMA Special Flood Hazard Areas in the project area and the areas that would be removed from the flood hazard zone if the proposed project were implemented. The proposed project would remove about 650 parcels from the FEMA flood hazard area (see Figure 2-5).

Comment 2-4 (California Department of Transportation): Storm Drains (Section 3.17)
Fourth sentence of the third paragraph of Section 3.17.2.2 (p. 3-189): This sentence states "Numerous storm drains empty into the system...." It is unclear the kind of "storm drains being referred to and discharged into which ''system" (i.e.; “the system" referring to the channels/creek or the drainage systems as a whole?). Please clarify in the DEIR which storm drains and system.

Response 2-4:
Section 3.17.2.2 of the EIR has been revised to indicate the number of storm drains and to clarify what is meant by “system”.

Comment 2-5 (California Department of Transportation): Floodplains (Section 3.17)
Page 3-190 of Section 3.17.2.2. Hydrology and Flooding: This section describes the existing conditions as "there is essentially no floodplain'' for Reaches 1-3 and "almost complete disconnection from the floodplain" for Reach 4. Based on Figure 2.4, it appears that the floodplain mainly contained in the channel and overtops to the surrounding area with the depth less than 1 foot during a 100 yr. flood event.

Response 2-5
The District concurs with this comment. The existing floodplain is mostly confined to the channel. Under existing conditions, the 100-year event would result in water overtopping the creek banks, causing flooding of nearby areas with water depths of 1 to 3 feet.

Comment 2-6 (California Department of Transportation): Encroachment Permit (Sections 2.5.6 and 3.10.3)
Please be advised that any work or traffic control that encroaches onto the State ROW requires an encroachment permit that is issued by Caltrans. To apply, a completed encroachment permit application, environmental documentation, and five (5) sets of plans, clearly indicating State ROW must be submitted to: David Salladay, District Office Chief, Office of Permits, California Department of Transportation, District 4, P.O. Box 23660, Oakland, CA 94623-0660. Traffic-related mitigation measures should be incorporated into the construction plans prior to the encroachment permit process. See this website for more information: www.dot.ca.gov/hq/traffops/developserv/permits.

Response 2-6

The need for an encroachment permit has been identified in Section 3.10.3.1 of the FEIR. The USACE will be responsible for securing project permits, and will apply to Caltrans for an encroachment permit consistent with applicable laws and regulations.

Comment 3-1 (San Francisco Bay Regional Water Quality Control Board): Introductory Comments

San Francisco Bay Regional Water Quality Control Board (Water Board) staff has reviewed the *Public Review Draft Environmental Impact Report for the Upper Berryessa Creek Flood Risk Management Project (State Clearinghouse No. 2001104013)* (DEIR) prepared by the Santa Clara Valley Water District (District) pursuant to the California Environmental Quality Act (CEQA). The project purpose is to convey the 1 percent exceedance probability flood event in Berryessa Creek from U.S. Interstate 680 in the City of San Jose for 2.2 miles downstream to Calaveras Boulevard in the City of Milpitas (Project).

The District is the local sponsor for the Project that the U.S. Army Corps of Engineers is constructing. The District is contributing a significant portion of the project cost; managing all real estate transactions for right-of-way land acquisition and easements; and will own and operate the project after it is constructed. Although the Corps previously screened alternatives in the *General Reauthorization Report/Environmental Impact Statement* (GRR/EIS) (March 2014), the District must also analyze alternatives pursuant to CEQA. The Corps-selected project design includes (but is not limited to) a roughly 1,300 foot long, 1.5 foot high floodwall. The District's preferred alternative is the same as the Corps' but with modifications which increase the length of the floodwall to about 2,200 feet, and the height by up to 0.5 feet. The added length and height would bring Alternative 2A to meet the Federal Emergency Management Administration's (FEMA) standards. As described further below, we provide the following comments on the DEIR, including, but not limited to:

- The DEIR alternatives analysis is limited to that of the Corps' GRR/EIS, so does not meet CEQA requirements to include a full array of feasible alternatives.
- Inconsistencies related to sediment and vegetation maintenance activities and mitigations.
- The Project preferred alternative would not comply with the *San Francisco Bay Water Quality Control Plan* (Basin Plan) requirement that impacts to wetlands and other waters of the State be avoided and minimized to the extent practicable.
- Mitigation for impacts on waters of the U.S. and waters of the State does not comply with the State and Regional Water Board policies.

Response 3-1

The District appreciates the SFBRWQCB's review of the DEIR. The bulleted comments above are addressed in detail in the responses to Comments 3-2 through 3-10.

Comment 3-2 (San Francisco Bay Regional Water Quality Control Board): Alternatives (Chapter 5)

The District only analyzed alternatives that were previously screened by the Corps for the Corps' Final GRR/EIS (March 2014). Therefore, the DEIR's alternatives analysis does not constitute a full array of feasible alternatives, so does not fully meet the CEQA requirements. This is particularly relevant because the Water Board cannot permit or certify the Project unless we concur with the lead agency's CEQA determination. As currently proposed, the Project does not meet the Water Board's policies, nor does it adequately meet CEQA requirements for reasons discussed in the following comments.

Response 3-2

Pursuant to CEQA Guidelines Section 15126.6, an EIR must analyze a reasonable range of alternatives that could feasibly attain the project's basic objectives while avoiding or substantially reducing any of its significant impacts. Generally, the nature and scope of alternatives to be evaluated in an EIR is governed by the rule of reason; the scope of alternatives must be considered in light of the nature of the project, the project's impacts, relevant agency policies, and other material facts. "Feasible" means capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors (CEQA Guidelines, Section 15364). In this case, the District is partnering with the USACE to implement a Congressionally-authorized project, and as such the project has to be consistent with the preferred alternative selected by the USACE (see Objective 3). Any alternative that differs substantially from the USACE's preferred alternative would require re-authorization by Congress, which would make that alternative infeasible. Therefore, it is reasonable to limit the consideration of alternatives only to those that would be consistent with the USACE's preferred alternative.

The statement that the Water Board cannot permit or certify the Project unless it concurs with the Lead Agency's CEQA determination does not accurately describe a Responsible Agency's role. CEQA does not call for a Responsible Agency to "concur" with the Lead Agency's EIR. If a Lead Agency has properly consulted with a Responsible Agency but the Responsible Agency believes that a Final EIR is not adequate for its use, CEQA Guidelines Section 15096(e) allows the responsible agency to either take the issue to court, be deemed to have waived any objection, or prepare a subsequent EIR under the limited circumstances allowed by CEQA Guidelines Section 15162.

Comment 3-3 (San Francisco Bay Regional Water Quality Control Board): Sediment Transport (Section 3.1)

The Project will result in a wider and deeper channel than the existing channel morphology, but the DEIR does not explain how sediment will be transported through the Project reach. Without explaining sediment transport in the Project, the DEIR does not adequately describe the potential post-Project impacts or mitigations necessary to address impacts for sediment removal maintenance activities. The DEIR, section 3.1 (last paragraph) states:

> *Because the proposed project is being designed to result in less erosion due to lower flow velocities, more stable bank design, and enhanced flow conveyance through bridges and culvert openings, operations and SMP2 maintenance actions associated with sediment removal and repair of eroded banks or access roads are likely to be reduced in magnitude compared to existing channel operations and maintenance activities.*

This statement is unfounded because the DEIR does not include data about existing sediment maintenance and how the Project will cause less sediment maintenance needs. In addition, without a sediment transport analysis, there is no evidence to show that the source of sediment is from eroding banks within the Project reach. Water Board staff's best professional judgment regarding sediment transport in the Project reach is that the existing channel expresses a sustainable shape throughout the system, and the Project documents do not support that the proposed channel design is sustainable (Attachment A1 through A3). For example, the channel models could not identify depositional areas due to the ongoing maintenance to remove sediment (Attachment A-3: GRR/EIS, Appendix B, Part III-Geomorphologic and Sediment Transport Assessment, pg. 2-17). The existing channel width is consistently about 10 to 12 feet, including areas upstream and downstream of the Project reach as

Water Board staff observed on September 4, 2015 and as shown in the Corps' draft 60 percent design plans (June 2015). The sediment processes in the Project reach will result in sediment accumulation and eventually the same channel dimensions as existing conditions. This could adversely impact flow conveyance, which would not be consistent with the Project objectives. Based on these findings, the Project will require ongoing, repetitive maintenance for sediment removal, which will result in repetitive impacts on the creek habitat which the DEIR does not disclose. Although the DEIR states that the District plans to conduct sediment maintenance to maintain conveyance (sections ES-5, 3.5.2.1), the maintenance needs may exceed the District's Stream Maintenance Program ("SMP2") thresholds, but this is not addressed in the DEIR. Please revise the DEIR to adequately explain the sediment transport processes in the Project, and the associated impacts due to future sediment maintenance activities and mitigations for the impacts.

Response 3-3
The EIR's sediment transport analysis is supported by substantial evidence. The proposed project would result in a channel slope that is very similar to the existing conditions (longitudinal grade between 0.2% and 0.5%), but with a widened channel to handle the 1% flood flows. The proposed channel design includes armoring of the bed and bank toe to prevent erosion, and according to our most recent sediment analyses (Tetra Tech 2015g), the proposed reach will act as a threshold channel, passing input sediment through with minimal deposition. In addition, sediment removal will continue in Upper Berryessa Creek, limiting the amount of sediment inflow into the project reach. It was observed through field visits that the existing project reach was mainly filled with fine sediment from local rill and gully erosion, which appears to be the primary source of sediment in the project reach areas, since most coarse sediment has deposited in the upstream reaches (from the debris basin, or removed from the channel) when transitioning to the flatter valley slope. With the proposed project, the banks will be stabilized and local sediment input will be reduced. In summary, overall sediment load in the creek will decrease after construction of the proposed project, and will be in equilibrium with sediment transport capacity, reducing the overall need for future sediment removal. Sediment removal may still be required at areas of local deposition.

According to the sediment transport model prepared by the District for this project (Tetra Tech 2015g), sediment aggradation would only occur at two locations, the UPRR trestle and UPRR culvert locations. The maximum increase would be about one foot (for five 10-year events) and would extend some 600 feet upstream of UPRR Culvert (for the 100-year flood event). However, the total depositional volume for the entire reach downstream of I-680 would be less than under the existing creek conditions. The District will continue to follow its Stream Maintenance Program Manual including implementing applicable BMPs during future sediment removal to ensure that effects on water quality or creek habitat, if any, would be less than significant.

Comment 3-4 (San Francisco Bay Regional Water Quality Control Board): Objectives (Section 2.3.5)
The DEIR lists the following three objectives for the Project (Section 2.3.5):

Objective 1: Reduce flood damages from Berryessa Creek upstream of Calaveras Boulevard throughout the study reach during the 50-year period of analysis beginning in 2017. Completed project would meet FEMA certification standards in all 4 project reaches.

Objective 2: Use environmentally sustainable design practices in addressing the flood risk management purpose of the project wherever possible within the study reach, including taking advantage of restoration opportunities that may be pursued incidentally to the flood damage reduction purpose.

Objective 3: Be consistent with Berryessa Creek Flood Risk Management Project Plan selected by USACE in the Director's Report of May 29, 2014.

Regarding Objective 2, the DEIR does not define "environmentally sustainable design practices." Please revise the DEIR to include the District's definition for this and to specify how the proposed Project meets this objective. Given Water Board staff's concerns regarding sediment transport in the Project (see Comment 2), the ongoing maintenance we anticipate will be necessary would not be consistent with an environmentally sustainable design.

Regarding Objective 3, the DEIR is not entirely consistent with the GRR/EIS because it does not include the GRR/EIS objective to "reduce sedimentation and maintenance requirements" (GRR/EIS, section 1.1). Please revise the DEIR to reconcile this discrepancy in consistency with the GRR/EIS.

Response 3-4

In regards to Objective 2, the fact that the reconstructed channel of Berryessa Creek after project implementation would require future maintenance (possibly including sediment removal) does not render the proposed project inconsistent with the project objectives. Project Objective 2 is "use environmentally sustainable design practices in addressing the food risk management purpose of the project wherever possible". The District considers environmental sustainability when making decisions that could impact the environment. Specifically, in the context of flood protection, the District strives to protect parcels from flooding by applying an integrated watershed management approach that balances environmental quality and protection from flooding. USACE and the District have carefully considered the potential environmental effects of the proposed project throughout the project planning and design process. However, this will not eliminate the need for future maintenance of a facility. The District will continue to perform necessary maintenance actions on stream channels to preserve flood conveyance capacity and structural integrity. The proposed project is designed to minimize impacts to the environment as documented in this FEIR and is consistent with Objective 2.

In regards to Objective 3, there is no legal requirement that USACE and the District have the same project objectives. The proposed project would result in an overall reduction in need for future sediment removal, which is substantiated by the project sediment transport model (Tetra Tech 2015g). The fact that the project would require future maintenance including sediment removal does not make the project inconsistent with the third project objective.

Comment 3-5 (San Francisco Bay Regional Water Quality Control Board): Sediment Removal, Biological Resources (Sections 2.3.5 and 3.5.5)

The DEIR, Section 2.5.5 states that the District plans to operate the Project under the District's existing Stream Maintenance Program (SMP2) for sediment removal tasks to maintain flow conveyance capacity and vegetation removal to maintain access and for fire prevention.

However, this contradicts the District's statement that the existing open water/aquatic vegetation (1.25 acres) and transitional vegetation ranging from the active channel to the channel uplands (up to about

3.27 acres) that will be removed for the Project would recolonize and thus serve to mitigate for what the District is calling a temporary impact that is less than significant with mitigation.

The following excerpt is the District's rationale for this finding (section 3.5.5.1):It is anticipated that wetland and transitional vegetation would regenerate naturally over the course of the first two growing seasons, and since the bottom width of the stream channel would be wider than under existing conditions, additional areas of wetland plant communities are likely to form.

Because wetland vegetation would regrow after construction is complete and the area of wetlands vegetation would increase when compared to the existing condition, this impact would be less than significant. Water Board staff does not agree that the impacts would be less than significant, given that the DEIR contains no plans or evidence to support that the same or comparable hydrophytic vegetation would colonize naturally and meet or surpass the functions and values of the existing vegetation. In addition, the District plans to remove sediment and vegetation (section 2.5.5), so the assumption that the impacted vegetation would recolonize is unfounded.

Please revise the DEIR to include appropriate mitigation to compensate for both temporal and spatial losses in functions and values of the open water/aquatic vegetation and transitional vegetation. Such a plan would need to include, at least at the conceptual level, the types, numbers, densities, and locations of vegetation plantings, and success criteria. The details would need to be further developed in a mitigation and monitoring plan. We note that while the DEIR includes plans to hydroseed the banks to promote bank stabilization, particularly after coconut-fiber blanket biodegrade (3+ years), the DEIR does not discuss the nature of hydroseed (e.g., the species make-up), monitoring plans, or other details to demonstrate appropriate level of compensation for impacts on open water/aquatic and transition vegetation.

Response 3-5

In analyzing Impacts BIO-2 and BIO-3, the EIR concludes that the construction impacts on riparian habitat, wetland vegetation, and waters of the U.S./State would be temporary and less than significant because vegetation would re-establish within two years and the wider channel would result in an increased amount of vegetation overall. This conclusion is based on the District's many years of experience constructing and maintaining streams in the Santa Clara Valley and conducting research into the regrowth of vegetation after disturbance due to ground-disturbing construction or maintenance activities. Research conducted by District biologists into regrowth is documented in in the "Instream Wetland Vegetation Regrowth Study" prepared by the District (Rankin and Hillman 2000). That research found that vegetation in similar creeks re-colonizes after sediment removal. This study found 65% and 98% regrowth within one and two years, respectively, after 1997 sediment removal at six non-tidal freshwater study sites. It also found that vegetation dominance and quality, as represented by vegetation type, total percent cover of vegetation, and relative percent cover of native and invasive species, were similar between pre- and post-project years. This research provides strong support for the rapid regrowth after disturbance of in-channel vegetation. Both the coverage area and species mix of the regrowth will be similar to pre-existing vegetation. This will be true after both project construction and future channel maintenance activities. Since the EIR concludes that Impacts BIO-2 and BIO-3 would be less than significant, no mitigation would be required.

Please also note that the conclusion of less-than-significant impacts on riparian habitat or wetland vegetation does not contradict or affect the EIR text informing the public and the decisionmakers that

after project construction, the District will perform future maintenance such as sediment removal under the ongoing Stream Maintenance Program.

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The proposed project includes hydroseeding to revegetate disturbed areas after construction is complete. Measure BIO-C in Section 3.5.6 of the FEIR requires that the hydroseed mix include only native grass and forbs seeds, consistent with Recommendation 4 of the USFWS CAR. This measure will promote establishment of native vegetation in the project area.

Comment 3-6 (San Francisco Bay Regional Water Quality Control Board): Beneficial Uses (Section 3.17)
The DEIR repeatedly states or implies that the existing habitat is of marginal quality (e.g., sections 3.5.2.1, 3.5.2.3, and Table 3.12) and uses this as a basis for maintaining the status quo or even reducing the Project reach's beneficial uses.

Water Board staff observed flowing and ponded water and egrets and mallard ducks in multiple sites along Reaches 1-3 during a site visit on September 4, 2015, despite the inspection occurring in the end of the dry season in the midst of a severe drought. These observations are consistent with the REC-2 (non-contact recreation such as bird-watching) and WILD (wildlife habitat) beneficial uses of the Project reach designated by the Water Board and listed in the Basin Plan, Table 2.1. The other beneficial uses are for body-contact recreation (REC-1); and warm water aquatic habitat (WARM). Because the Project would impact aquatic and transitional vegetation, the habitat the vegetation supports would be impacted. However, the DEIR does not address this. Please revise the DEIR to recognize the Project reach's designated beneficial uses and a plan to appropriately mitigate any unavoidable impacts on the creek habitat, especially the REC-2 and WILD beneficial uses.

Response 3-6
Section 3.5.2 and Appendix C of the EIR provide detailed information on the types of habitat and their quality in the project area. Appendix C documents the results of detailed investigations of the project area by qualified biologists in 2014. The findings of these recent investigations are consistent with the findings of the project Coordination Act Report (CAR) issued by USFWS in 2013. The CAR states "The project area has poor to non-existent wildlife habitat due to channelization and vegetation removal. Field surveys conducted in the project area have documented some of the common species that inhabit the area. Bird species observed include: great egret, black-crowned night heron, western scrub jay and mourning dove. Amphibians found in the creek include Pacific tree frog and western toad. Mammals observed include ground squirrels and muskrat, as well as feral cats." The USFWS also noted "the only fish species likely to be found in the project area are the mosquitofish and California roach. The mosquitofish is a non-native freshwater species introduced throughout California for mosquito control. The California roach is a native species widely distributed throughout central and northern California. Neither the mosquito fish or California roach is State or federally listed, or has any special status." Both the CAR and the more recent field investigations confirm that wildlife habitat of the project area is heavily disturbed and marginal.

During site visits the RWQCB casually observed the presence of egrets and multiple ducks in the project area. These birds are common in urban areas and their presence is not inconsistent with marginal habitat quality. The District believes that the description of habitat value in the DEIR, which is based on recent biological field investigations and the USFWS CAR, is accurate and based on substantial evidence.

The proposed project would temporarily disturb the marginal aquatic and riparian habitat occurring in the project area, temporarily displacing wildlife of the area. No impacts to endangered, threatened, or other special status wildlife would result. As described in Section 3.5.3 of the EIR, the project area would re-vegetate rapidly after construction, facilitated by hydroseeding with native grasses and forbs and planting of native trees and shrubs. As explained in the response to Comment 3-5, rapid regrowth of the transitional wetland vegetation in this area is expected, and there is considerable similar habitat found adjacent to and downstream of the project area that will provide similar benefits to wildlife during construction and while regrowth is occurring.

The beneficial uses of Berryessa Creek surface water, ground water, and wetlands are described in Section 3.17.3.2 of the EIR. Section 3.17.5.2 of the EIR analyzes the potential impacts to those beneficial uses and concludes that the proposed project would result in significant impacts to designated beneficial uses of Berryessa Creek, primarily through degradation of water quality during the construction period, which could adversely beneficial uses, including warm freshwater habitat (WARM) and wildlife habitat (WILD). To reduce impacts to beneficial uses, the following mitigation measures would be applied during project implementation:

- WAQ-A: Implement measures for protecting water quality
- WAQ-B: Prepare and implement a dewatering plan
- WAQ-C Prepare and implement a rain action event plan
- HMW-A Prepare a spill prevention and response plan
- HMW-C Treat VOC-contaminated groundwater encountered at JCI Off-site Area

As described in Section 3.17.6 of the EIR, application of these measures would reduce impacts to beneficial uses, including WARM and WILD by preventing the transport of pollutants to the creek channel. The residual impact to beneficial uses designated in the Basin Plan after application of these measures would be less than significant.

EIR Section 3.14.5 analyzes potential impacts to non-contact recreational uses (i.e. beneficial use REC2) of Berryessa Creek. Those uses would be temporarily disrupted during the construction period for the proposed project which will last an estimated two years. Construction activities would prevent access to the creek for recreational uses and generate noise and visual impacts that would degrade the recreational experience. However, only portions of the creek would be under construction at any one time, and REC2 uses would continue in the areas not under active construction. Thus, the temporary disruption of REC2 uses at a particular location would last for less than two years and the impact would be less than significant. In addition, Sections 3.14.2 and 3.14.5 discusses that there are no existing water contact recreational use (Beneficial Use REC1) due to limited water in the creek and lack of fish species that are of interest of anglers. The project's impact on REC1 use would be less than significant.

After construction is complete, implementation of Mitigation Measure LND-A would increase the length of recreational trail along the creek compared to the existing conditions. Thus, with application of Mitigation Measure LND-A, the proposed project would have a long-term positive impact to REC-2 uses.

Comment 3-7 (San Francisco Bay Regional Water Quality Control Board): Groundwater, Hydrology (Section 3.17)

The District's alternatives analysis does not adequately address the potential of exposing the water table in new areas and resultant alterations in the creek's hydrology. Consequently, the DEIR does not include any mitigation for this potential impact on the post-Project hydrology. The Project would excavate to variable depths of 9 to 20 feet (Table 5.4). Given that the depth to groundwater ranges from about 7 to 20 feet below grade (EIR, Appendix D-Geotechnical Report), the post-Project conditions would likely result in more area of the channel invert being in the groundwater table than existing conditions. Please revise the DEIR to address the post-Project hydrology conditions, and the impacts from vegetation and sediment maintenance activities on the creek's functions, values, and beneficial uses.

Response 3-7

Table 5.4 of the EIR does not state that the project would excavate to a depth of 20 feet. The table presents the size of the enlarged channel after project implementation, which would range in depth up to 14 feet below the top of bank. However, compared to the existing channel, the average channel depth would increase by only 18 to 24 inches. This minimal increase in channel depth would not result in significant changes in creek hydrology due to increased inflow of groundwater as the typical depth to groundwater would continue to be greater than the post-construction channel depth.

During project construction, portions of the channel will be overexcavated (i.e. excavated below the finished channel bed elevation) to install bed armor and culverts and to relocate utility lines. These excavations have the potential to encounter groundwater. Mitigation Measure WAQ-B requires the preparation and implementation of a dewatering plan to handle groundwater that seeps into construction area during construction. The dewatering plan will include testing of the groundwater that seeps into the construction area before it is released downstream to prevent adverse effects on water quality. Additionally, energy dissipation methods will be employed to prevent bed scour when the water is released. In the JCI plume area, encountered groundwater will be collected and treated to meet RWQCB standards before release to the downstream creek channel (see Mitigation Measure HWM- C in FEIR section 3.9.6).

As described in FEIR Section 3.17.3.2, the Basin Plan adopted by the RWQCB designates the following beneficial uses of Berryessa Creek surface water: water contact recreation (REC1), noncontact water recreation (REC2), warm freshwater habitat (WARM), and wildlife habitat (WILD). FEIR Section 3.5.5 analyzes the potential for the proposed project to impact the creek's biological functions and values, including WARM and WILD beneficial uses. FEIR Section 3.14.5 analyzes the potential for the proposed project to affect REC1 and REC2 beneficial uses. These analyses confirm that the proposed project would result in less than significant impacts to the creek's functions, values, or beneficial uses.

Comment 3-8 (San Francisco Bay Regional Water Quality Control Board): Bank Stabilization (Section 2.5.1)

> A. The DEIR main body discusses that biodegradable coconut mats will be used for erosion control and bank stabilization (sections ES4, 2.5, and others). However, Appendix D Geotechnical Report (April 2015), section 2.1 states: "The erosion protection will consist of rip rap on the lower portion of the slope and geocells filled with aggregate or concrete on the upper portion of the slope," and this is reiterated in section 23. In addition, Appendix D, section 12 states: Rip rap is also being used for the channel invert between approximately Stations 115+00

and 164+00.” Please revise the DEIR to reference any inaccuracies in the Geotechnical Report (or any other appendices, as appropriate). Please note that the Water Board staff has communicated to the Corps-District design team that the use of geocell bank stabilization does not comply with Water Board policies or the requirements in the Basin Plan to avoid and minimize impacts to the extent practicable.

B. Hydroseed. The DEIR states: “Channel banks would be protected with biodegradable erosion control blankets and hydroseeded” (ES-4; Table ES-2; section 2.5.2; and others). We caution that erosion control treatments such as hydroseeding, hydraulic mulch, tackifiers, soil binders, and straw mulch could wash into the channel rendering the erosion prevention method ineffective. Other soil bioengineering methods such as the planting of willow stakes and emergent in-stream vegetation could be used to stabilize the bed and banks below the mean high water level. Has the District considered integrating willow stakes or other bioengineering methods in the Project for bank stabilization?

Response 3-8

Since the DEIR was released for public review, the Geotechnical Report (Tetra Tech 2015c) has been updated and geocells are no longer included in the project. The updated Geotechnical Report is included in Appendix D of this FEIR. The following text has been added to Sections ES-4 and 2.5.2: The channel banks would be protected with biodegradable erosion control blankets and hydroseeded, an approach that has been shown in the project Design Documentation Report (Tetra Tech 2015f) to be sufficient to prevent significant erosion.

The bed of the reconstructed channel will be hydroseeded with native wetlands plans to promote vegetation growth and protect against erosion, consistent with the RWQCB’s recommendations. USACE and the District considered planting of willows in the creek channel as recommended by the RWQCB but found that this approach would increase channel roughness and decrease flow conveyance capacity. This would result in the need to either enlarge the channel or add higher levees/floodwalls to meet the project’s flood protection objective. These new structural features would add to the considerable cost of installing and maintaining the planted willow trees. In addition, the construction of levees/floodwalls would result in adverse environmental impacts to visual quality, air quality, biological resources, noise, recreation, and transportation and traffic. During the construction period, building the levees/floodwalls would generate greater construction noise, vehicle trips, and emissions of criteria pollutants and greenhouse gases as compared to the proposed project. The floodwalls/levees would worsen unavoidable and significant impacts in the areas of construction noise and emissions of air pollutants and greenhouse gases. After construction, the levees/floodwalls would constitute a barrier between the creek channel and surrounding lands, adversely affecting visual quality of the area, REC2 beneficial uses, and wildlife movement; however, these impacts would not be significant. Additionally, USACE policies require the maintenance of a 15-ft vegetation-free zone on either side of levees and floodwalls (USACE, 2008), which would preclude mitigation measure BIO-B and result in potentially significant adverse effects to riparian habit. Because erosion control can be achieved without incurring the prohibitive costs and adverse environmental effects to visual quality, air quality, biological resources, noise, recreation, and transportation and traffic that would result from planting willow trees in the channel, USACE and the District reject this suggested measure.

Comment 3-9 (San Francisco Bay Regional Water Quality Control Board): Alternatives Analysis for the 401 Certification

Please note that for the Water Board to permit the proposed Project pursuant to the Clean Water Act, Section 401, we require a project proponent to conduct an alternatives analysis consistent with the U.S. Environmental Protection Agency's 404(b)(1) Guidelines. The Basin Plan incorporates the 404(b)(1) Guidelines by reference to determine the circumstances under which filling of wetlands, streams or other waters of the U.S. and/or the State, as the District proposes with this Project, may be permitted. In accordance with the Basin Plan, filling, dredging, excavating and discharging into a wetland or water of the state is prohibited unless the project meets the least environmentally damaging practicable alternative (LEDPA) standard as determined through the 404(b)(1) alternatives analysis. Although the LEDPA analysis is not required by CEQA, a project proponent may tailor their alternative analysis to fulfill both the CEQA and 404(b)(1) requirements to help expedite the Water Board's Project review to issue a 401 Certification.

For example, during pre-CEQA interagency meetings, Water Board staff made suggestions that would help the Project meet the LEDPA standard by minimizing impacts in the creek and maximizing its beneficial uses (Interagency meetings, August 4 and August 11, 2015). This input includes: (1) planting willow stakes in the streambed edges; (2) installing the proposed pre-cast concrete culverts at grades that allow the formation of earthen bottoms; (3) using bioengineering methods in place of concrete for bank armoring and/or some or all floodwalls; and (4) identifying opportunities to maximize both flood conveyance capacity and opportunities for future adaptive management of the channel by increasing channel cross section. For example, such adaptive management practices could be completed where the Corps' preferred alternatives propose reaches with maintenance access roads on both sides of the channel, by removing or lowering the road on the non-multi-purpose path side.

The District did not incorporate the Water Board staff's suggestions in the CEQA analysis, except for DEIR Alternative 4. At three times the cost of the District preferred alternative, Alternative 4 is cost-prohibitive because it apparently incorporates the "all options" scenario (though this is not explicitly explained in the DEIR). Water Board staff recommends the District revise the CEQA alternatives analysis to include feasible alternatives to meet the LEDPA standard. This would help expedite Water Board staff's project review for the 401 Certification process.

Response 3-9

The project sponsors are aware of the need for approval of the project under Section 401 of the CWA. Section 2.5.6 of the Draft EIR describes required permits and approvals, including detailed discussion of the need for Section 401 approval. The CWA requires the USACE to apply the 404(b)(1) guidelines in deciding whether to permit discharges of dredged or fill material into waters of the U.S. The guidelines generally prohibit the Corps from issuing a permit if there is a practicable alternative to the proposed discharge that would have less adverse impact on the aquatic ecosystem, as long as the alternative does not have other significant adverse environmental consequences (40 CFR 230.10(a)). Thus, Section 404(b)(1) requires that a project directly affecting waters of the U.S. must be the least environmentally damaging practicable alternative (LEDPA) to receive regulatory approval. A key part of LEDPA is the legal definition of practicable: "practicable" means "available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes." (40 CFR 230.3).

The District agrees that a LEDPA analysis is not required by CEQA, but contrary to the RWQCB comment, has concluded based on substantial evidence that the proposed project is the LEDPA, as defined by EPA regulations at Title 40 CFR 230. The proposed project would result in significant impacts in the following

topic areas before implementation of mitigation measures: Air quality (Impacts AIR-2 and AIR-3), biological resources (Impacts BIO-4 and BIO-5), cultural resources (Impacts CUL -1, CUL2, and CUL-4), geology and soil (Impacts GEO-1 and GEO-2), greenhouse gas emissions (Impacts GHG-1), hazardous materials (Impacts HWM-1 and HWM-2), land use and planning (LND-2), noise (NOI-1 and NOI-4), traffic and transportation (TRA-4, TRA-5, TRA-6), utilities and service systems (UTL-1), and water quality and hydrology (WAQ-1, WAQ-5, and WAQ-6). EIR Alternative 2A would have almost identical impacts as the proposed project, with the only differences being slightly reduced seismic hazards (Impact GEO-1) and reduced potential for hazardous material spills and exposure of persons (HWM-1 and HWM-2). However, the proposed project would meet all project objectives while Alternative 2A would not. EIR Alternatives 2B and 4 would result in greater impacts than the proposed project in a number of topic areas. Construction period emissions of criteria pollutants and greenhouse gases would be greater (AIR 2 and AR-3). Alternatives 2B and 4 would also have larger footprints and longer construction period than the proposed project, result in increased construction- period impacts to biological resources (BIO-2, BIO-4, and BIO-5), increased potential for impacts to cultural resources (CUL-1, CUl-2, and CUL-4), increased potential for seismic hazards and soil erosion (GEO-1 and GEO-2), increased potential for spills or releases of hazardous materials or contaminated groundwater (HWM-1, HWM-2, and UTL-1), increased construction noise (NOI-1 and NOI-2), increased construction traffic (TRA-4 and TRA-5), and greater impacts to water quality (WAQ-1, WAQ-5, and WAQ-6). Additionally, Alternative 4 would have greater potential for conflict with the Milpitas Trails Master Plan due to the adverse effects of floodwalls on recreational quality. Similar to Alternative 4, the RWQCB-proposed alternative would have a larger footprint, a longer construction period, and extensive floodwalls, resulting in greater construction-period impacts to air quality, biological resources, cultural resources, geology and soils, hazardous materials, noise, traffic and transportation, and water quality than the proposed project. In the long-term, the RWQCB-recommended alternative would result in somewhat higher quality riparian and aquatic habitat than the proposed project. Overall, the RWQCB–recommended alternative would be more environmentally damaging than the proposed project due to the severity and wide number of construction-period impacts. For those reasons the District believes that the proposed project would be the less damaging alternative.

In regard to the measures recommended by the RWQCB, measures 1, 3, and 4 would require the construction of levees/floodwalls to meet the project design flow. Construction of floodwalls/levees would result in adverse environmental impacts to visual quality, air quality, biological resources, noise, recreation, and transportation and traffic. During the construction period, building the levees/floodwalls would generate greater construction noise, vehicle trips, and emissions of criteria pollutants and greenhouse gases as compared to the proposed project. The floodwalls/levees would worsen unavoidable and significant impacts in the areas of construction noise and emissions of air pollutants and greenhouse gases. After construction, the levees/floodwalls would constitute a barrier between the creek channel and surrounding lands, adversely affecting visual quality of the area, REC2 beneficial uses, and wildlife movement; however, these impacts would not be significant. Additionally, USACE policies require the maintenance of a 15-ft vegetation-free zone on either side of levees and floodwalls (USACE, 2008), which would preclude planting or growth of trees in much (if not all) of the project area, resulting in long-term adverse effects to WILD, REC1 and REC2 beneficial uses. Measure 2 would be difficult and expensive to construct due to the presence of underground utility lines in the vicinity of the proposed culverts at the UPRR trestle, Piedmont Creek confluence, and Los Coches Creek confluence.

The RWQCB-recommended alternative, like Alternative 4 in the Draft EIR, would include a larger channel size (compared to the proposed project or Alternative 2A) which would enlarge the project footprint and

result in greater implementation costs for both land acquisition and construction. The existing creek ROW is bounded by dense urban development on all sides and acquiring the land to enlarge the channel to implement the RWQCB would be prohibitively expensive and logistically impracticable due to the need to remove active railroad tracks. Neither the USACE nor the District has the legal authority to acquire land containing active railroad lines without the owner's consent. UPRR has stated that they intend to continue operating the railroad tracks adjacent to the creek channel indefinitely, and have entered long-term contracts with customers to provide service using these tracks (Ygbuhay, 2014). Therefore, the RWQCB-recommended alternative is impracticable for the same reasons as Alternative 4 in the DEIR.

Comment 3-10 (San Francisco Bay Regional Water Quality Control Board): Summary
In summary, Water Board staff appreciates the opportunity to provide comments on the DEIR. The DEIR is well-organized, but it does not adequately describe the proposed Project's environmental impacts and associated mitigations. In addition, the proposed Project would not meet the Water Board's requirements for project proponents to avoid and minimize impacts and to appropriately compensate for any unavoidable impacts in accordance with the Basin Plan and (404(b)(1) Guidelines.

Response 3-10
The District appreciates the RWQCB's review of the DEIR and the comments submitted by the agency. See also responses to comments 3-2, 3-5, 3-6, and 3-8 above for additional analysis of project alternatives and impacts. As documented in the FEIR, the proposed project avoids and minimizes environmental impacts to the maximum practicable extent. As stated in the response to comment 3-9 above, USACE and the District have determined that the proposed project is the LEDPA as defined in the 404)(b)(1) guidelines.

Comment 4-1 (VTA)
VTA has no comments on the Draft EIR for the above referenced project. Thanks.

Response 4-1
The District appreciates the efforts by VTA to participate in the CEQA process for this important project.

Comment 5-1 (Citizens Committee to Complete the Refuge/Santa Clara Valley Audubon Society): Integration with USACE EIS
We appreciate the District's recognition that FEMA certification needs to be an outcome of the Project, therefore initiating this DEIR. There is the question: wasn't that concern known when the Corps was preparing its Environmental Impact preparing its Environmental Impact Statement (EIS), prior to 2013? As the Draft EIS was an integrated document, why didn't the District participate in it or, in parallel, prepare a DEIR? Wouldn't it have been suitable to include a FEMA certifiable alternative at that time?

Response 5-1
This comment does not raise an issue related to the adequacy of the EIR impact analysis. Nevertheless, the following response is provided.

The National Environmental Policy Act is a Federal law applicable to Federal Agencies, including USACE. In 2014, USACE prepared a General Re-Evaluation Report/Environmental Impact Statement meeting NEPA requirements. The California Environmental Quality Act is a state law applicable to California state and local agencies, including the District. The District prepared the Draft EIR in conformance with CEQA

requirements. There are no legal requirements for a project EIS and EIR to be a combined document. For logistical and resource allocation reasons, as well as timing of funding, the District and USACE were not able to produce a combined document.

Comment 5-2 (Citizens Committee to Complete the Refuge/Santa Clara Valley Audubon Society): Section 401 Water Quality Certification/RWQCB Concerns

These questions come to mind in light of the Corps' decision that it may invoke the Clean Water Act (CWA) 404r exemption. Under that action the Corps proposes replacing the San Francisco Bay Regional Water Quality Control Board (RWQCB) for Section 401 Water Quality Certification. Through our experience with other projects, we are aware that the certification process of the RWQCB requires the review of a Final EIR, per obligations of the State of California established under the Porter Cologne Act. While acting as the agent for the federal responsibility, the RWQCB also assures that particular water quality interests of the State are fulfilled, oversight that the 404r will not provide. Aren't the State's interests of value to this Project and to the District? If the District had produced a Final EIR in 2013, wouldn't that have provided time for a RWQCB 401 certification process to complete in time for construction to begin in 2016?

Response 5-2
This comment does not raise an issue related to the adequacy of the EIR impact analysis. Nevertheless, the following response is provided.

The District takes great strides all its operations to protect water quality and biological resources within the waterways owned and operated by the District. Potential project impacts to water quality are analyzed in Section 3.17 Hydrology and Water Quality of the EIR. That section also contains measures to mitigate those impacts to a less than significant level. See also the response to comment 3-9 above for a discussion of the CWA permit requirements applicable to the proposed project.

There is no requirement that an EIR and EIS for the same project be prepared concurrently. The possible benefits and drawbacks of having prepared the EIR at a different time are speculative.

The state's interests are of value to the District and USACE; the Section 401 water quality certification process is in process. USCACE submitted a Section 401 application to the RWQCB on September 25, 2015. On October 23, 2015, the RWQCB responded by requesting additional project information. USACE submitted the requested additional information to RWQCB on December 18, 2015. Consultation between USACE (i.e. project applicant) and RWQCB regarding the 401 certification is ongoing.

Comment 5-3 (Citizens Committee to Complete the Refuge/Santa Clara Valley Audubon Society): Notice of Preparation
There is substantive concern that the Notice of Preparation of record is 14 years old. In this DEIR, the District explained that it tried but was unable to contact commenters to that NOP. The District must explain why a new NOP was not issued for this DEIR. It is quite likely that the affected and interested parties may have changed. For instance, are today's Milpitas residents and that City's park officials aware that they will lose a pocket park and its associated pocket ecosystem? Based on these considerations, it appears that the NOP should have been recirculated. That was the path the District followed not long ago, for its CEQA process for the Shoreline Feasibility Study, again local partner to the

Corps. Please respond to these concerns. Finally, the Notice of Availability (NOA) for this DEIR was inadequate, it being notable that five major, local environmental organizations were not noticed on it (Joint Letter to J. Manitakos, 11/12/15). Given the long, forgotten NOP, the District needed to make a very significant effort to deliver the NOA to interested parties which it did not.

Response 5-3

The District prepared the NOP for the EIR in conformance with CEQA Guidelines section 15082, which does not require recirculation of the NOP after a set time period. Therefore, the District met all legal requirements for preparation and circulation of the NOP. As described in Section 1.2.1 of the Draft EIR, the District conducted a robust effort to circulate the NOP that met all CEQA requirements. The District's efforts include filing the NOP with the State Clearinghouse, posting it at local libraries, and mailing it directly to interested parties including state and local agencies. The District has met many times with the City of Milpitas staff to discuss the proposed project, including the need to remove the pocket park. The District also hosted project information meetings in May and August 2015 for local residents of the project area.

The pocket park is described and potential project impacts to it are analyzed in sections 3.10 Land Use and Planning and 3.14 Recreation of the EIR. The District has met with City of Milpitas representatives on many occasions to discuss the proposed project. Additionally, the District provided copies of the DEIR to the City Planning Department in the number and formats requested by the City of Milpitas. The DEIR provided useful information on the project and an opportunity for interested parties to comment on the proposed project.

Comment 5-4 (Citizens Committee to Complete the Refuge/Santa Clara Valley Audubon Society): Notice of Availability

Under the heading of "Basic Purposes of CEQA" in the General Concepts, 14 CCR § 15002, the first listed purpose is:

> (1) Inform governmental decision makers and the public about the potential, significant environmental effects of proposed activities.

Toward that end, we share comments here on issues that inadequately meet the need to inform by omission, by use of assumption or, perhaps, by simple oversight of information relevant to associated impacts and mitigations.

Response 5-4

The District followed all legal requirements for provision of the NOA, published a display ad in the San Jose Mercury News, and made the DEIR available at multiple locations. In addition, copies of the DEIR were sent to multiple recipients, including all agencies and individuals that had previously expressed interest in this project. In addition, the District responded favorably to a request from five environmental groups for additional time to review the Draft EIR and submit comments beyond the Nov. 12, 2015 legally established comments period end date. Two of these groups submitted comment letter No. 5 on November 30, 2015. The District not only accepted that late comment letter but carefully considered the concerns raised in the letter and provides full responses herein to the comments in that letter.

Comment 5-5 (Citizens Committee to Complete the Refuge/Santa Clara Valley Audubon Society): Land Use and Water Quality (Sections 3.10 and 3.17)

Piedmont and Los Coches Creeks: The Project Description includes the following statement: "Installation of concrete box culverts and wingwalls at Los Coches and Piedmont Creeks, with access roads constructed over the top of the culverts."

Subsequently the DEIR explains that the new culverts will improve contributory creek hydrology, angled to direct flow downstream and a change removing the current right angle juncture. These are major changes to creeks that contribute to the flood risks of upper Berryessa and for which a full characterization is needed of the affected area of each creek. What are the existing uses on the adjoining land such as where the access road will go? Might the new culvert have upstream impacts and are they beneficial? Given Los Coches upstream extent, what level of sediment does it transport?

Response 5-5

Existing land uses at the project area and adjacent lands are described in Section 3.10 Land Use and Planning of the EIR. That section also analyzes potential project impacts to those land uses. Impacts of the project on hydrology and sedimentation of the creek channel are analyzed in Section 3.17 Hydrology and Water Quality of the EIR. The proposed project would add a concrete culvert at the downstream end of Los Coches Creek, replacing the existing failing sacked concrete, eroded banks, and concrete bed lining. The new culvert would be within 100 ft of the creek's confluence with Lower Berryessa creek and construction disturbance would affect only the short section of creek at the confluence. Since the bottoms of the culverts are designed to be installed below the invert elevation of Los Coches and Piedmont Creeks, flow volumes and sediment transport capacity would not be affected by the proposed project, and the culvert will not restrict flow or sediment passage. The existing uses at the culvert location consist of the Los Coches Creek and an adjacent paved pathway. The proposed project would replace those uses with a more stable creek channel and an access road surfaced with compacted aggregate. The change in land use would not be significant.

Comment 5-6 (Citizens Committee to Complete the Refuge/Santa Clara Valley Audubon Society): Sedimentation (Section 3.17)

Sediment Deposition and Maintenance: In discussion of Hydrology Impact WAQ-3, the section on operations includes the following:

"Although reduced velocities and lower water surface elevations may reduce the sediment transport capacity, this effect is likely to be balanced by decreased erosion and diminished sediment input. Furthermore, any backwater effect that occurs where the downstream end of Reach 1 at Calaveras Boulevard transitions into the Lower Berryessa Creek channel would be eliminated when the Lower Berryessa Creek Program is constructed, further reducing sediment deposition in the lower end of Reach 1." (Ed. Note: italics added) This argument, supporting a conclusion of less than significant impact, uses the assumptive "may", "likely" and "would" as its basis. Were these assumptions tested through hydrologic modelling? This is a 2.2 mile long project. How can it be known if the Lower Berryessa Project "would" have a beneficial sediment transport impact in Reach 1 or possibly further upstream? The geomorphology discussed in Section 3.17.2.1 is of a stream with minimal gradient throughout its length, with slope in the range of a mere 0.35% to 0.5%. With the widened channel reducing water velocity, detailed analysis needs to be evident to demonstrate whether or not sediment deposition is significant.

Will the Project necessitate increased frequency for maintenance dredging to ensure the flood risk reduction is achieved long term? If analysis exists that supports the DEIR's conclusion, please provide it.

Response 5-6

As described in Section 3.17 Hydrology and Water Quality of the EIR, the proposed project would reduce sediment input into Upper Berryessa Creek by stabilizing the currently eroding bed and banks of the creek. The proposed project would not increase the frequency of future sediment removal activities. Section 8.3 of the FEIR contains a complete bibliography of all scientific and technical literature cited in the DEIR. See also the response to Comment 3-3 above and the following key technical studies: Northwest Hydraulic Consultants, 2006; SCVWD, 2015b, Tetra Tech, 2012, 2015a, 2015e, and 2015g; and Winzler and Kelly, 2010.

Comment 5-7 (Citizens Committee to Complete the Refuge/Santa Clara Valley Audubon Society): Contaminated Soils (Section 3.9)

Contaminated Soil Testing and Disposal: As discussed in detail in the EIR, a substantial area of Reach 2 of the Project is affected by locally historic spills of hazardous materials at sites adjoining or near enough to have produced large plumes that run below the creek. These spills introduced a number of volatile organic compounds (VOC) and other hazardous materials into the environment. While the responsible businesses no longer exist, monitoring and mitigation of these spills is ongoing. Two of the sites are each the source of the separate, large plumes: The former Jones Chemicals Inc. adjoins and is parallel to the creek. The other, the former Great Western Chemical Company, is set back about a block from the creek. Due to their proximity, additional testing was performed for the DEIR along that area of Reach 2. Soil tests were conducted of core samples collected by boring along the creek's access road. Results showed that VOC concentrations detected in the upper 15 feet (as deep as the project expects to dredge the channel) are below risk-based screening levels. On this basis, the EIR states that reuse and transport of soils off-site for disposal would be classified non-hazardous. As a result, no hazardous waste impact addresses soil testing. While the tests results are relevant, the expanse of the contaminated area and the possibility that pockets of higher contamination levels may exist questions whether such a conclusion is adequate environmentally. The existing conditions imply that all due caution is needed. We are aware that clean soils from other District creek projects are transported for reuse by the South Bay Salt Pond Restoration Project for sensitive restoration actions. As a responsible agency, all appropriate precaution should be taken by the District to assure that there is no likelihood that hazardous levels of VOCs or other contaminants are present before transport for any other reuse. Prior to transport, the Project should be monitoring soil for such hazards.

Response 5-7

The two groundwater plumes referenced in the comment are described in great detail in Section 3.9 Hazardous Materials of the EIR. That section also analyzes the potential for project construction activities to encounter contaminated soil or groundwater and concludes that contaminated soil is not expected to occur within the project footprint and would not be encountered during project construction (for additional details, see the HTRW Soil Sampling Report in FEIR Appendix E). Although soil at the project area is not contaminated, contaminated groundwater may be encountered. Mitigation Measure HWM-C requires treatment of contaminated groundwater prior to its release to the environment to prevent adverse water quality effects. The treated groundwater would comply with levels established by the San Francisco Bay Regional Water Quality Control Board in Order No. R2-2012-0012 and would not result in adverse effects to the environment. See also response to Comment 3-2.

Comment 5-8 (Citizens Committee to Complete the Refuge/Santa Clara Valley Audubon Society): Nesting Bird Impacts (Section 3.5)

State Regulation of Plants and Wildlife: The Project took guidance for Biological Resources impacts from the US Fish & Wildlife Service response to the Corp's Integrated Document, finalized in 2013. While that guidance is appropriate, it is not sufficient in California. The California Department of Fish & Wildlife (CDFW) sets requirements that provide protection for Species of Special Concern as well as for protection of sensitive habitats e.g. nesting birds. These regulations need to be applied in mitigation BIO-A (p. 3-69) during construction, in addition to the USFWS requirements. From the DEIR: "Mitigation Measure BIO-A would require pre-construction nesting bird surveys and establishment of appropriate buffers, reducing impacts to nesting resident bird species. " This statement leaves open the question of what "pre-construction" means nor does it establish a time of- year. Whenever possible, construction should not occur during nesting season. If done during nesting season, then special precautions are necessary. Birds can build a nest, lay eggs, and start raising young within two weeks, and an entire reproductive cycle may start and end within 30 days. Mr. Dave Johnston, Environmental Scientist, CDFW, recommends that pre-construction and pre-vegetation removal surveys should occur no more than 24 hours before work commences. If work in a particular location stops for more than 24 hours (such as over a weekend or holiday), surveys should be done again before work recommences. Surveys should take place at all locations within 300 feet of actual project activity and if the project 'moves" to a new location then the buffer and surveys should move as well. Mr. Johnston also recommends a preliminary survey 30 days ahead of time to give the project proponent an idea of what to expect once they are ready to begin work. It is important too to survey for ground-nesting birds in addition to those that nest in shrubs and trees. Surveys for ground-nesting birds should be performed 24-hours prior to vegetation removal or disturbance. If nests are found, buffers would be set and work within the buffer areas should be postponed until the nestlings have fledged. If raptors or special status species nests are found, CDFW should be called on to set appropriate buffers.

Response 5-8

The District provided two copies of the Draft EIR directly to CDFW; no comments on the DEIR were received from CDFW. The District agrees with the comment authors that implementation of Mitigation Measure BIO-A: Perform Pre-construction Nesting Bird Surveys and Establish Appropriate Buffers will prevent significant adverse effects to nesting birds, including ground-nesting birds. The measure specifies the time of year when surveys would occur, the appropriate buffer distances for nesting birds and an enlarged buffer for raptor nests. The timing of the pre-construction surveys will adhere to established protocols as determined by the qualified biologist conducting the surveys and will be sufficient to reduce potential impacts to less than significant levels (see Sections 3.5.5 and 3.5.6 of the EIR). As noted in the comment, the reproductive cycle for birds takes 30 days, therefore it is not necessary to conduct pre-construction surveys within 24 hours of the start of construction to prevent adverse effects to nesting birds.

Comment 5-9 (Citizens Committee to Complete the Refuge/Santa Clara Valley Audubon Society): Pocket Park Removal (Sections 3.10 and 3.14)

The pocket park near the juncture with Los Coches Creek, is planned for removal by the Project to make way for an access road. As mentioned previously, we are curious as to whether the current residents are informed on the removal. In the Recreation analysis, it is noted that the next closest city park is a mile from the Pocket Park site, on the other side of I-680. Under the DEIR's land use analysis, the existing conditions mention "relatively small amounts of single family residential and parks/open space" and then does not further address the impact of replacing the park/open space with an access road. The

Land Use and Recreation sections both refer to Milpitas trail plans but do not explain if the possibility of using the access road in a trail system is accepted as suitable mitigation for loss of the Pocket Park and of the pocket-ecosystem it provided. The loss requires formal, specified mitigation.

Response 5-9

Potential project impacts to the pocket park are analyzed in Section 3.14 Recreation of the EIR. As discussed in Section 3.14 Recreation, the equipment in the park receives minimum use and thus the impact from removing the park would be less than significant and does not require mitigation. With respect to the impact relating to the closure of the access road to public use as a trail, if the proposed project is implemented the District would work with the City of Milpitas to execute a Joint Use Agreement to allow public access to a trail along the creek (See Mitigation Measure LND-A Allow Public Access to Creek Right of Way in the EIR); this mitigation would be sufficient in reducing the impact to a less-than-significant level.

Comment 5-10 (Citizens Committee to Complete the Refuge/Santa Clara Valley Audubon Society): Land Use and Planning (Section 3.10)

Our review of this Project sparked disappointment. Here we see again a long trapezoidal channel designed only for the purpose of water transport, having long spans devoid of any shade nor of any other functions that a creek can provide. This is inconsistent with the direction that creek actions have taken in recent decades and is not the preference of local jurisdictions. The DEIR reports the expectation that the City of Milpitas will one day incorporate the extended access roads in its trail system. To that point the DEIR provides the following quotes from the City's General Plan:

4.g-I-7. Ensure that all landscaping within and adjoining a Scenic Corridor or Scenic Connector enhances the City's scenic resources by utilizing an appropriate scale of planting, framing views where appropriate, and not forming a visual barrier to views; and relates to the natural environment of the Scenic Route; and provides erosion control.

4.g-I-13 - Develop the section of Berryessa Creek which runs through the Town Center into a scenic as well as a recreational resource for the Town Center. Town Center is found on both sides of the creek along the Calaveras Boulevard corridor, and includes approximately 800 feet of the channel area in Reach 1.

2.a-I-17. Foster community pride and growth through beautification of existing and future development.
Or consider DEIR quotes from Envision 2040, the San Jose General Plan:
Development adjacent to creekside areas should incorporate compatible design and landscaping, including appropriate setbacks and plant species that are native to the area or are compatible with native species. Development should maximize visual and physical access to creeks from the public right-of-way while protecting the natural ecosystem. Consider whether designs could incorporate linear parks along creeks or accommodate them in the future.

Clearly these jurisdictions value the aesthetic contribution that a shaded, vegetation-lined creek can provide. The 2001 NOP listed the following objectives:

1. Improve flood protection in the cities of San Jose and Milpitas;
2. Reduce sedimentation and maintenance requirements in the creek;
3. Provide for recreational amenities;

4. Integrate ecosystem restoration into the project.

Unfortunately, that NOP describes a project that would involve a much longer length of the creek and does not help us know what the intentions were for the portion that is now this Project. Even so, the principle of ecological consideration as part of the design is consistent with inclusion of such action at whatever location it is possible, improving and going above and beyond, in this case, the function of flood control. This Project plans to hydroseed the slopes of the rebuilt creek and plant replacement trees within the Project but it does not discuss such planting as ecological improvements nor suggest an objective to produce an attractive, multi-functional, waterway-focused community amenity. This Project is funded, in part, by the District's Safe, Clean Water & Natural Flood Protection Program, a program that was approved in 2012 by well over two thirds of the voters. The Programs web page has the following:

"The voters of Santa Clara County clearly recognize the importance of a safe, reliable water supply. They value wildlife habitat, creek restoration and open space."

Response 5-10

Potential project impacts to land uses and the degree of project conformance with land use policies of the Cities of San Jose and Milpitas are analyzed in Section 3. 10 Land Use and Planning of the EIR. Significance criterion LND-2 expressly addresses potential conflicts with local land use plans and policies. The proposed project would be consistent with City of Milpitas Master Plan policies 4.d.-A-8 and 4.g.I-13, which address design of flood protection projects and development of Berryessa Creek in the Town Center area (i.e. Reach 1 of the project area). The proposed project would provide flood protection as called for by Policy 4.d.-A-8 and would facilitate future development of a recreational trail in the Reach 1 Town Center area as called for by Policy 4.g.I-13. Only a portion of Reach 4 is within the city limits of San Jose. The proposed project would provide flood protection in accordance with goals EC5.4 and EC5.5 of the *Envision San Jose 2040* General Plan.

Comment 5-11 (Citizens Committee to Complete the Refuge/Santa Clara Valley Audubon Society): Tree Removal (Section 3.5)

Considering these planning principles together, it saddens us to see a District Project that is so out of sync with the design preferences of today. The mitigation for tree removal states that the Corps will plant replacement trees in the "vicinity." The Project should develop that action jointly with the local jurisdictions, toward an outcome of an improved water course that attracts and enriches the community.

Response 5-11

See Mitigation Measure BIO-B Compensate for Trees and Shrubs Removed During Construction in Section 3.5.6 of the EIR. This measure requires the planting of native trees and shrubs in the project vicinity to replace the trees and shrubs removed during project construction. The project development team has identified locations within the project area suitable for planting of the number of native trees and shrubs recommended by USFWS and the project design incorporates these planting areas. The native trees and shrubs would be planted within a few feet of the creek channel and would benefit the aesthetic, recreational, and biological values of the creek corridor.

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8. AGENCIES AND PERSONS CONTACTED, REFERENCES AND LITERATURE CITED, AND REPORT PREPARERS

8.1. CONSULTATION AND COORDINATION

Agencies and other groups that were consulted with during the preparation of this EIR include the following:

U.S. Army Corps of Engineers
Bay Area Air Quality Management District
California Department of Fish and Wildlife, Central Coast Region
California Department of Water Resources
California Department of Transportation
California Air Resources Board
San Francisco Bay Regional Water Quality Control Board
Santa Clara County, Planning Office

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APPENDICES

Appendix A **Public Comments and Notice of Preparation**

Appendix B **Air Quality Model Data Sheets**

Appendix C **Wetlands/ Other Waters of the U.S. / Waters of the State Delineation Report**

Appendix D **Geotechnical Report**

Appendix E **Hazardous Toxic, and Radioactive Waste (HTRW) Soil Sampling Report**

Appendix F **Tree and Shrub Survey Report and Impact Analysis**

Appendix G **Public Comments on the DEIR**

Appendix H **Draft Groundwater Management Plan**

Appendix A Public Comments and NOP

STATE OF CALIFORNIA

GOVERNOR'S OFFICE *of* PLANNING AND RESEARCH

State Clearinghouse

261741/4.2

Gray Davis
GOVERNOR

Steven A. Nissen
DIRECTOR

RECEIVED
NOV 02 2001
BY: A.D.

Notice of Preparation

October 29, 2001

To: Reviewing Agencies

Re: Berryessa Creek Project: Calaveras Boulevard to Old Piedmont Road, San Jose and Milpitas, California
SCH# 2001104013

Attached for your review and comment is the Notice of Preparation (NOP) for the Berryessa Creek Project: Calaveras Boulevard to Old Piedmont Road, San Jose and Milpitas, California draft Environmental Impact Report (EIR).

Responsible agencies must transmit their comments on the scope and content of the NOP, focusing on specific information related to their own statutory responsibility, within 30 days of receipt of the NOP from the Lead Agency. This is a courtesy notice provided by the State Clearinghouse with a reminder for you to comment in a timely manner. We encourage other agencies to also respond to this notice and express their concerns early in the environmental review process.

Please direct your comments to:

Mr. Rene Langis
Santa Clara Valley Water District
Coyote Watershed Program Office
2471 Autumnvale Drive, Suite G
San Jose, CA 95131

with a copy to the State Clearinghouse in the Office of Planning and Research. Please refer to the SCH number noted above in all correspondence concerning this project.

If you have any questions about the environmental document review process, please call the State Clearinghouse at (916) 445-0613.

Sincerely,

Katie Shulte Joung
Associate Planner, State Clearinghouse

Attachments
cc: Lead Agency

Document Details Report
State Clearinghouse Data Base

SCH# **2001104013**
Project Title Berryessa Creek Project: Calaveras Boulevard to Old Piedmont Road, San Jose and Milpitas, California
Lead Agency U.S. Army Corps of Engineers

Type **NOP** Notice of Preparation

Description The action being taken is a General Reevaluation Report to study alternatives to increase the level of flood protection, reduce sediment load and maintenance requirements, enhance the ecosystem, and provide additional recreation opportunities in the cities of San Jose and Milpitas.
The project is intended to achieve the following objectives:
1) Improve flood protection in the cities of San Jose and Milpitas;
2) Reduce sedimentation and maintenance requirements in the creek;
3) Provide for recreational amenities;
4) Integrate ecosystem restoration into the project.

Lead Agency Contact

Name Mr. Rene Langis
Agency Santa Clara Valley Water District
Phone 408 586-0110 ***Fax*** 408 586-0101
email rlangis@scvwd.dst.ca.us
Address Coyote Watershed Program Office
2471 Autumnvale Drive, Suite G
City San Jose ***State*** CA ***Zip*** 95131

Project Location

County Santa Clara
City
Region
Cross Streets Old Piedmont Road, Calaveras Boulevard
Parcel No.
Township ***Range*** ***Section*** ***Base***

Proximity to:

Highways 237
Airports
Railways
Waterways
Schools
Land Use

Project Issues Flood Plain/Flooding; Vegetation; Wildlife; Aesthetic/Visual; Other Issues; Recreation/Parks; Landuse; Water Quality; Air Quality; Traffic/Circulation

---

Reviewing Agencies Resources Agency; Office of Historic Preservation; Department of Parks and Recreation; San Francisco Bay Conservation and Development Commission; Department of Water Resources; Department of Fish and Game, Region 3; Native American Heritage Commission; State Lands Commission; Caltrans, District 4; State Water Resources Control Board, Division of Water Rights; Department of Toxic Substances Control; Regional Water Quality Control Board, Region 2

Date Received 10/29/2001 ***Start of Review*** 10/29/2001 ***End of Review*** 11/27/2001

Note: Blanks in data fields result from insufficient information provided by lead agency.

NOP Distribution List

County: Santa Clara **SCH#** 2001104013

Resources Agency

Resources Agency
Nadell Gayou

Dept. of Boating & Waterways
Bill Curry

California Coastal Commission
Elizabeth A. Fuchs

Dept. of Conservation
Ken Trott

Dept. of Forestry & Fire Protection
Allen Robertson

Office of Historic Preservation
Hans Kreutzberg

Dept of Parks & Recreation
Resource Mgmt. Division

Reclamation Board
Pam Bruner

S.F. Bay Conservation & Dev't. Comm.
Steve McAdam

Resources Agency
Nadell Gayou
Dept. of Water Resources

Health & Welfare

Health & Welfare
Wayne Hubbard
Dept. of Health/Drinking Water

Food & Agriculture

Food & Agriculture
Tad Bell
Dept. of Food and Agriculture

Fish and Game

Dept. of Fish & Game
Scott Flint
Environmental Services Division

Dept. of Fish & Game 1
Donald Koch
Region 1

Dept. of Fish & Game 2
Banky Curtis
Region 2

Dept. of Fish & Game 3
Robert Floerke
Region 3

Dept. of Fish & Game 4
William Laudermilk
Region 4

Dept. of Fish & Game 5
Don Chadwick
Region 5, Habitat Conservation Program

Dept. of Fish & Game 6
Gabrina Gatchel
Region 6, Habitat Conservation Program

Dept. of Fish & Game 6 I/M
Tammy Allen
Region 6, Inyo/Mono, Habitat Conservation Program

Dept. of Fish & Game M
Tom Napoli
Marine Region

Independent Commissions

California Energy Commission
Environmental Office

Native American Heritage Comm.
Debbie Treadway

Public Utilities Commission
Andrew Barnsdale

State Lands Commission
Betty Silva

Governor's Office of Planning & Research
State Clearinghouse Planner

Colorado River Board
Gerald R. Zimmerman

Tahoe Regional Planning Agency (TRPA)
Lyn Barnett

Office of Emergency Services
John Rowden, Manager

Delta Protection Commission
Debby Eddy

Santa Monica Mountains Conservancy
Paul Edelman

Dept. of Transportation

Dept. of Transportation 1
IGR/Planning
District 1

Dept. of Transportation 2
Vicki Roe
Local, Development Review, District 2

Dept. of Transportation 3
Jeff Pulverman
District 3

Dept. of Transportation 4
Jean Finney
District 4

Dept. of Transportation 5
Lawrence Newland
District 5

Dept. of Transportation 6
Marc Birnbaum
District 6

Dept. of Transportation 7
Stephen J. Buswell
District 7

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Mike Sim
District 8

Dept. of Transportation 9
Caroline Yee for Kate Walton
District 9

Dept. of Transportation 10
Chris Sayre
District 10

Dept. of Transportation 11
Lou Salazar
District 11

Dept. of Transportation 12
Aileen Kennedy
District 12

Business, Trans & Housing

Housing & Community Development
Cathy Creswell
Housing Policy Division

Caltrans - Division of Aeronautics
Sandy Hesnard

California Highway Patrol
Lt. Julie Page
Office of Special Projects

Dept. of Transportation
Ron Helgeson
Caltrans - Planning

Dept. of General Services
Robert Sleppy
Environmental Services Section

Air Resources Board

- Airport Projects
  Jim Lerner
- Transportation Projects
  Ann Geraghty
- Industrial Projects
  Mike Tollstrup

California Integrated Waste Management Board
Sue O'Leary

State Water Resources Control Board
Diane Edwards
Division of Clean Water Programs

State Water Resources Control Board
Greg Frantz
Division of Water Quality

State Water Resouces Control Board
Mike Falkenstein
Division of Water Rights

Dept. of Toxic Substances Control
CEQA Tracking Center

Regional Water Quality Control Board (RWQCB)

RWQCB 1
Cathleen Hudson
North Coast Region (1)

RWQCB 2
Environmental Document Coordinator
San Francisco Bay Region (2)

RWQCB 3
Central Coast Region (3)

RWQCB 4
Jonathan Bishop
Los Angeles Region (4)

RWQCB 5S
Central Valley Region (5)

- **RWQCB 5F**
  Central Valley Region (5)
  Fresno Branch Office
- **RWQCB 5R**
  Central Valley Region (5)
  Redding Branch Office

RWQCB 6
Lahontan Region (6)

- **RWQCB 6V**
  Lahontan Region (6)
  Victorville Branch Office

RWQCB 7
Colorado River Basin Region (7)

RWQCB 8
Santa Ana Region (8)

RWQCB 9
San Diego Region (9)

25.4.5

October 27, 2001

NOTICE OF PREPARATION

For an Environmental Impact Statement (EIS)/Environmental Impact Report (EIR) for the Berryessa Creek Project: Calaveras Boulevard to Old Piedmont Road San Jose and Milpitas, California

The U. S. Army Corps of Engineers (Corps) and the Santa Clara Valley Water District (District) are conducting a General Reevaluation Report for Berryessa Creek. The study will focus on alternatives to increase the level of flood protection, reduce sediment load, enhance the ecosystem within and along the creek, and provide for recreation opportunities. The Berryessa Creek watershed is located in Santa Clara County, south of San Francisco Bay. Berryessa Creek is a tributary to the Coyote Creek system, which flows into the southern end of San Francisco Bay. The Corps is the lead agency for environmental review under the National Environmental Policy Act (NEPA), and will be preparing a joint EIS/EIR. The District is the lead agency for environmental review under the California Environmental Quality Act (CEQA). The District wishes to know your views or those of your agency as to the scope and content of the environmental analysis that should be considered. For agencies, this information should be relevant to your agency's statutory responsibilities in connection with the proposed project. Some agencies will use the EIS/EIR when considering permit applications or other types of review and approval for this project.

The project description, location, and environmental effects that will be evaluated are discussed in the attached Project Description.

Please respond in writing or by electronic mail no later than **November 27, 2001** to indicate who the contact person at your agency will be. Send your response to the following person:

Mr. René Langis
Santa Clara Valley Water District
Coyote Watershed Program Office
2471 Autumnvale Drive, Suite G
San Jose, CA 95131
rlangis@scvwd.dst.ca.us

Additional information on this project including the Notice of Preparation will be posted soon on the District's website at www.heynoah.org.

Stanley M. Williams
Chief Executive Officer

Attachment

NOTICE OF PREPARATION
PROJECT DESCRIPTION

Draft Environmental Impact Statement (EIS)/Environmental Impact Report (EIR) for the Berryessa Creek Project

Introduction and Need for EIS/EIR

The Berryessa Creek Project (Project) is a joint project of the U.S. Army Corps of Engineers (Corps), Sacramento District, and the Santa Clara Valley Water District (District)). The Corps is the lead agency for compliance with the National Environmental Policy Act (NEPA), and the District is the lead agency for compliance with the California Environmental Quality Act (CEQA). These lead agencies have determined that the Berryessa Creek Project may have a significant impact on the quality of the environment, and have decided to prepare an EIS/EIR to provide ample opportunity for public disclosure and participation in the planning and decision-making process. The integrated document will include sufficient information for approval of the Project and compliance with NEPA and CEQA. The purpose of Draft EIS/EIR process is to develop and assess a recommended plan and alternatives for the Project, and to avoid and/or mitigate significant adverse effects on environmental resources. The EIS/EIR will address a reasonable range of alternatives, environmental effects of the alternatives, and compliance with related environmental laws and permits.

Project Description

The action being taken is a General Reevaluation Report to study alternatives to increase the level of flood protection, reduce sediment load and maintenance requirements, enhance the ecosystem, and provide additional recreation opportunities in the cities of San Jose and Milpitas. The Berryessa Creek watershed is located in Santa Clara County, south of San Francisco Bay. Berryessa Creek is a tributary to the Coyote Creek system, which flows into the southern end of San Francisco Bay. The watershed is about 22 square miles in area, and drains portions of the Diablo Range on the east side of the Santa Clara Valley. The reach of Berryessa Creek being studied for the General Reevaluation Report is approximately 4.5 miles in length, and extends from about 600 feet upstream of Old Piedmont Road in the City of San Jose down to Calaveras Boulevard (Highway 237) in the City of Milpitas, as shown in the attached figure.

The focus of the Berryessa Creek Project is to improve flood protection and reduce sedimentation while avoiding environment impacts and providing appropriate habitat restoration. The Project is intended to achieve the following objectives:

1) Improve flood protection in the cities of San Jose and Milpitas;
2) Reduce sedimentation and maintenance requirements in the creek;
3) Provide for recreational amenities;
4) Integrate ecosystem restoration into the project.

The Berryessa Creek Project was authorized for construction by the Water Resources Development Act (WRDA) of 1990. Prior studies on Berryessa Creek indicate that certain areas in San Jose and Milpitas continue to be at risk from a 100-year flood event. These studies also indicate that sediment deposition in the creek is a continual maintenance problem, and natural resources along the creek are degraded as a result of channeling and concrete lining of the creek. The General Reevaluation Report will address an array of project alternatives to address flooding and sedimentation issues, and provide ecosystem restoration when feasible. Alternatives to be analyzed will include a combination of one or more sediment reduction measures. These alternative measures may include levee work, off-line flood and sediment storage basins, adding vegetation along the creek, and improving or replacing culverts to improve flood conveyance and fish passage.

Possible Environmental Issues

Significant issues to be analyzed in depth in the EIS/EIR include appropriate levels of flood protection, potential adverse effects on vegetation and wildlife resources, special status species, aesthetics, cultural resources, recreation, land use, fisheries, water quality, air quality, transportation, socioeconomics, and cumulative effects of related projects in the study area. The Corps will consult with the State Historic Preservation Officer, and the U.S. Fish and Wildlife Service to provide a Wildlife Coordination Act Report as an appendix to the EIS/EIR.

Formal Scoping and Public Participation

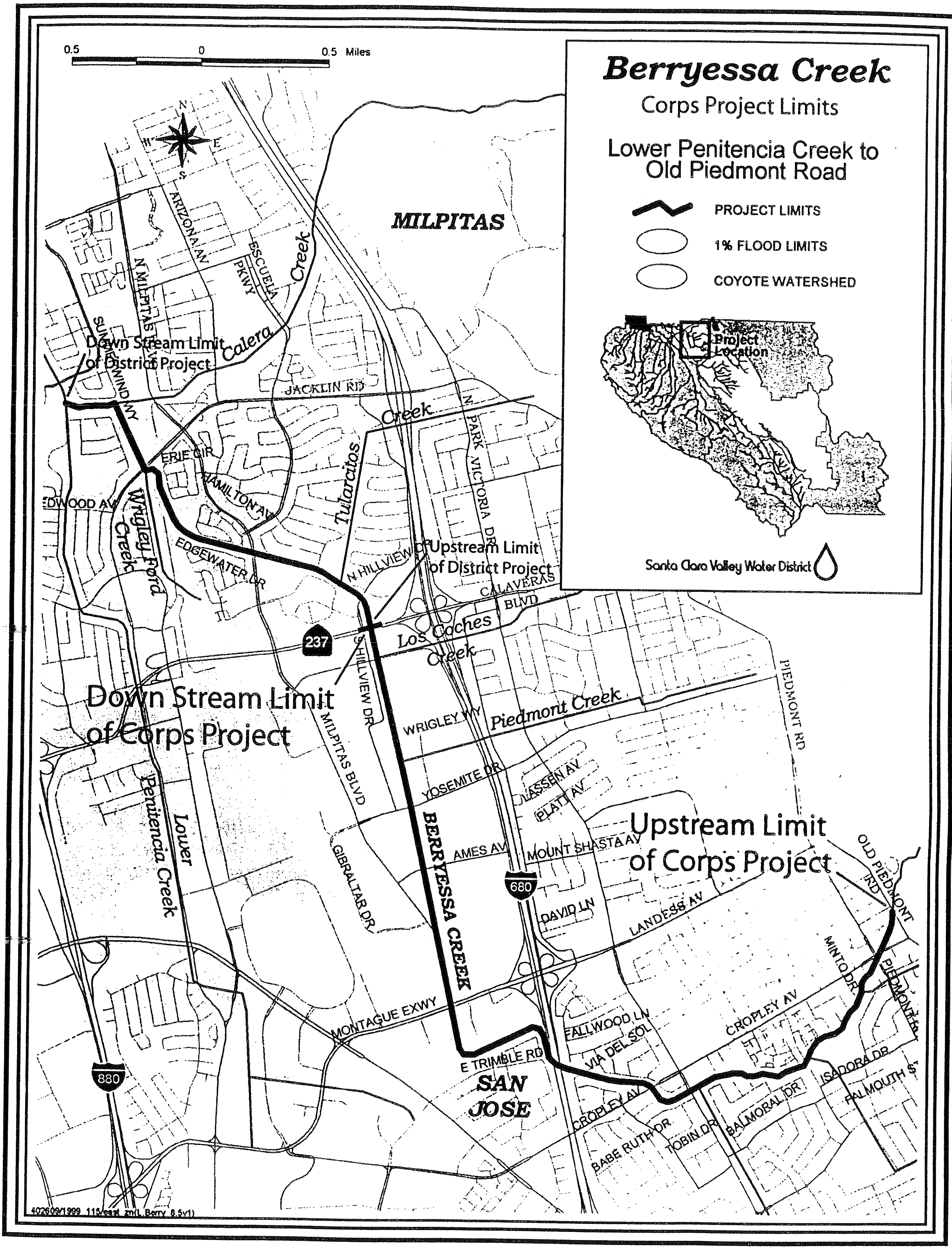
Federal, state, and local responsible and other agencies, and interested individuals, are encouraged to participate in the EIS/EIR scoping process. The Corps will file a Notice of Intent in the Federal Register, pursuant to NEPA requirements. A 30-day public scoping period under CEQA will commence on October 27, 2001, and end on November 27, 2001. Public comment is invited on the proposal to prepare the EIS/EIR, and on the scope of issues to be included in the EIS/EIR. A public scoping meeting is scheduled for November 7, 2001 at the location identified below. Concerned persons and organizations are invited to call or write to be included on the mailing list for public meetings or to receive other correspondence concerning the Berryessa Creek Project.

- ❑ The scoping meeting on November 7, 2001 will be from 7:00 to 9:00 p.m. at the City of Milpitas Police Department at 1275 North Milpitas Boulevard, Milpitas, California 95035.

All written comments should be submitted within 30 days of the published date of this notice to:

Mr. René Langis, Environmental Planner
Santa Clara Valley Water District, Coyote Watershed Program Office
2471 Autumnvale Drive, Suite G
San Jose, California, 95131

Rlangis@scvwd.dst.ca.us
Telephone: (408) 586-0110
Fax: (408) 586-0101



Berryessa Creek
Corps Project Limits
Lower Penitencia Creek to Old Piedmont Road
PROJECT LIMITS
1% FLOOD LIMITS
COYOTE WATERSHED
Project Location
Santa Clara Valley Water District
0.5
0
0.5 Miles
MILPITAS
SAN JOSE
Down Stream Limit of District Project
Upstream Limit of District Project
Down Stream Limit of Corps Project
Upstream Limit of Corps Project
BERRYESSA CREEK
Calera Creek
Tularcitos Creek
Wrigley Ford Creek
Los Coches Creek
Piedmont Creek
Lower Penitencia Creek
JACKLIN RD
N MILPITAS BLVD
ARIZONA AV
ESCUELA PKWY
ERIE CIR
HAMILTON AV
EDGEWATER DR
N HILLVIEW DR
N PARK VICTORIA DR
CALAVERAS BLVD
WRIGLEY WY
YOSEMITE DR
JASSEN AV
PLATT AV
AMES AV
MOUNT SHASTA AV
DAVID LN
LANDESS AV
MONTAGUE EXWY
E TRIMBLE RD
FALLWOOD LN
VIA DEL SOL
CROPLEY AV
BABE RUTH DR
TOBIN DR
BALMORAL DR
ISADORA DR
FALMOUTH ST
MINTO DR
PIEDMONT RD
OLD PIEDMONT RD
GIBRALTAR DR
MILPITAS BLVD
S HILLVIEW DR
237
680
880
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SANTA CLARA COUNTY
STREAMS FOR TOMORROW
Post Office Box 1409
San Martin, California 95046

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November 10, 2001

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G. Fowler
M. Klemencic
J. Ortiz
J. Gutierrez
Liz Holland
M. Hayden
File = 25.24

Dr. Rene Langis
Santa Clara Valley Water District
Coyote Watershed Program Office
2471 Autumnvale Drive, Suite G
San Jose, CA 95131

UPPER 4.9

Dear Dr. Langis:

Response to Notice of Preparation for an Environmental Impact Statement / Environmental Impact Report (EIS/EIR) for the Berryessa Creek Project: Calaveras Boulevard to Old Piedmont Road

We have the following comments for your consideration regarding the scope and content of the proposed draft EIS/EIR for the Berryessa Creek Project (Project).

It is difficult to provide specific comments and recommendations about the scope and content of the environmental review of the Project in the absence of a specific project description. Although the Notice of Preparation (NOP) includes the Project objectives and states that an array of project alternatives to address these objectives will be identified, no project-specific nor site-specific features are described. This circumstance limits comments at this time to a more general level of discussion.

The NOP states that studies indicate that "natural resources along the creek are degraded as a result of channeling and concrete lining of the creek." The Project should address this degradation by reducing the effects and features of channelization and eliminating existing concrete lining to the maximum extent possible. Project features should emphasize softscape approaches to bank stabilization and erosion control needs. Sediment reduction and management features should emphasize source controls and off-line sediment storage basins in addition to employing natural fluvial processes. All Project features should contribute to a substantial reduction in channel maintenance requirements.

All Project features for flood protection, bank stabilization and sediment reduction, should demonstrably contribute to ecosystem restoration.

The Preferred Project should be a channel design that uses natural fluvial processes to achieve ecosystem restoration to the maximum extent feasible, rather than a design that relies on engineered structures and regular maintenance. In this regard, if the Project requires extensive modification of the Berryessa Creek channel, the Project design should follow that of the Lower Silver Creek Project in providing, to the extent possible, "a multi-stage channel including a base flow channel formed by natural fluvial processes, a sediment transport channel sized to mobilize and transport sediment at an ecologically relevant frequency, and an effective in-channel floodplain to dissipate high flow energy and facilitate the natural formation of an appropriately sized base flow channel" (page 8, September 2001 Addendum to the IS/ND for the Lower Silver Creek Watershed Project).

An objective of the Project should be to design sediment transport features that employ natural processes so that sediment will be mobilized during flow events that are frequent enough to maintain fish and wildlife habitat diversity and complexity, while correspondingly reducing the frequency and magnitude of sediment removal maintenance in the main channel. Source controls and natural sediment transport processes are favored over in-channel sediment traps and basins that require frequent and extensive maintenance and channel disturbances.

Maintenance roads should not be located in the channel, and definitely not on the channel invert.

The EIS/EIR must describe the maintenance program for the Project and assess the environmental effects of any maintenance activity not already included in the District's Multi-Year Stream Maintenance Program (SMP). Any significant impacts from new maintenance activities must be mitigated in the EIS/EIR and incorporated into the SMP.

Since ecosystem restoration is a Project objective, the preferred project design should provide for the maximum amount of riparian and wetland vegetation along the creek as maintenance access requirements will allow. Plantings will not be limited to compensatory mitigation obligations. The Project offers an opportunity to establish extensive amounts of wetland and riparian vegetation, which will enhance local bird habitats. Recreational trails should be designed and sited to be consistent with maximizing the wildlife benefits of the riparian corridor.

Although Berryessa Creek apparently does not support nor has potential to support anadromous salmonids, such as steelhead trout, project features to provide fish passage at in-stream structures will benefit the local movements and migrations of resident fishes, thus contributing to ecosystem restoration.

The EIS/EIR will need to demonstrate in a comparative fashion that the preferred project is the least damaging alternative to wetland and riparian vegetation and the fish and wildlife resources of Berryessa Creek, and qualifies as the environmentally superior alternative under the California Environmental Quality Act.

Thank you for the opportunity to comment on the subject NOP. If you have questions about our comments, please contact me at the letterhead address or telephone number (408) 683-4330 (voice and fax).

When available, please send us a copy of the draft EIS/EIR.

Sincerely,

Keith R. Anderson

Keith R. Anderson
Environmental Advocate

STATE OF CALIFORNIA - BUSINESS, TRANSPORTATION AND HOUSING AGENCY GRAY DAVIS, *Governor*

DEPARTMENT OF TRANSPORTATION
P O BOX 23660
OAKLAND, CA 94623-0660
Tel: (510) 286-4444
Fax: (510) 286-5513
TDD (510) 286-4454

RECEIVED
NOV 29 2001
BY: AD

November 21, 2001

SCL-General
SCL000140
SCH 2001104013
261741/4.2

Mr. Rene' Langis
Santa Clara Valley Water District
Coyote Watershed Program Office
2471 Autumnvale Drive, Suite G
San Jose, CA 95131

Dear Mr. Langis:

Berryessa Creek Project: Calaveras Blvd. to Old Piedmont Rd. – Notice of Preparation (NOP)

Thank you for including the California Department of Transportation (Department) in the environmental review process for the proposed project. We have examined the NOP and have the following comment:

The Berryessa Creek Project should accommodate the Department's existing storm drainage facilities at each of the State highway bridge crossings.

We look forward to reviewing the Draft Environmental Impact Report (DEIR) and any relevant project plans or engineering reports for this project. We do expect to receive a copy of the DEIR from the State Clearinghouse, but in order to expedite our review, you may send two copies in advance to:

Maija Cottle
Office of Transportation Planning B
Department of Transportation, District 4
P.O. Box 23660
Oakland, CA 94623-0660

Should you require further information or have any questions regarding this letter, please call Maija Cottle, of my staff at (510) 286-5737.

Sincerely,

RANDELL H. IWASAKI
Acting District Director

By Jean CR Finney

JEAN C. R. FINNEY
District Branch Chief
IGR/CEQA

c: Katie Shulte Joung (State Clearinghouse)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

May 6, 2013

U.S. Army Corps of Engineers
Sacramento District
1325 J Street
Sacramento, California 95814-2922

Attention: Tyler Stalker

Subject: Draft Environmental Impact Statement for the Berryessa Creek Project, Santa Clara County, California (CEQ # 2013068)

The U.S. Environmental Protection Agency (EPA) is providing comments on the Draft Environmental Impact Statement (DEIS) for the Berryessa Creek Project. Our comments are provided pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), our NEPA review authority under Section 309 of the Clean Air Act, and the provisions of the Federal Guidelines promulgated at 40 CFR 230 under Section 404(b)(1) of the Clean Water Act.

EPA provided scoping comments for this project in a letter dated January 3, 2002. We support the Corps' interest in developing an economically justified and environmentally sound flood protection project; however, we are concerned that the effect of sea-level rise on the project has not been sufficiently considered, as required by the Corps own Climate Change Adaptation Policy Statement. We are also concerned that the DEIS does not provide sufficient analysis of temperature effects and maintenance requirements for the project, nor provide sufficient assurance that the Corps is prepared for the possibility of encountering contamination during the project. Additionally, we ask the Corps to clarify whether any project alternatives preclude floodplain terracing and riparian revegetation in the Greenbelt Reach, upstream of the project area.

Based on our concerns about sea-level rise, water quality, and maintenance, we have rated the action alternatives Environmental Concerns – Insufficient Information (EC-2). The enclosed Detailed Comments elaborate on these concerns and our recommendations.

We appreciate the opportunity to review this DEIS. When the Final EIS is released for public review, please send one hard copy and one electronic copy to the address above (mail

code: CED-2). If you have questions, please contact me at (415) 972-3521 or have your staff contact Tom Kelly at kelly.thomasp@epa.gov or (415) 972-3856.

Sincerely,

/s/

Kathleen Martyn Goforth, Manager
Environmental Review Office
Communities and Ecosystems Division

Enclosures: EPA's Detailed Comments
Summary of EPA's Rating Definitions

cc (via email): Dennis Cheong, Santa Clara Valley Water District
Shin-Roei Lee, Regional Water Quality Control Board, San Francisco Bay
Mark Johnson, Regional Water Quality Control Board, San Francisco Bay
Margarete Beth, Regional Water Quality Control Board, San Francisco Bay
Tami Schane, California Department of Fish and Wildlife

Sea-Level Rise

The DEIS does not appear to consider rising sea levels that will result from climate change. The Army Corps' own policy[1] states "it is the policy of USACE to integrate climate change adaptation planning and actions into our Agency's missions, operations, programs, and projects."

A San Francisco Bay Conservation Development Commission report[2] evaluated the impact of a 16-inch sea level rise by mid-century, and a 55-inch sea level rise by the end of the century to the San Francisco Bay shoreline. In regard to flood control projects, the report states:

> With higher Bay water levels and more extreme storm events, Bay water will intrude further into flood control channels making it more difficult for fresh water to drain rapidly from upland areas. This will increase flood risks in locations further upstream. More precise identification of upland areas near creeks and flood channels where this type of flooding may occur is needed for addressing future flood risks. Exploring alternative methods of flood control may be necessary.
>
> *Recommendation:*
> The FEIS should specifically consider the effects of rising sea level on the Berryessa Creek project.

Water Resources

Temperature Impacts

The DEIS notes that current temperatures, as high as 84.7^{o}F, reduce the habitat available to native fish and amphibians in Berryessa Creek, which prefer cooler temperatures (p.4-24). Water temperature is a key indicator of poor water quality in Berryessa Creek, yet the DEIS considers shading the creek as an "aesthetic feature" (p. 3-24). Only alternative 4/d appears to address high water temperatures by including more than 8 acres of trees and vegetation to shade the creek (p. 3-57). The benefits of shading proposed by this alternative are described as "less than significant," a "slightly decreased water temperature," (p. 5-20) and "minimal" (Table 5-10), but the DEIS provides no basis for these conclusions.

---

[1] USACE Climate Change Adaptation Policy Statement, effective June 3, 2011, <http://www.corpsclimate.us/docs/USACEAdaptationPolicy3June2011.pdf>

[2] Living with a Rising Bay: Vulnerability and Adaptation in San Francisco Bay and on its Shoreline, San Francisco Bay Conservation and Development Commission, October 6, 2011 <http://www.bcdc.ca.gov/BPA/LivingWithRisingBayvst.pdf>

Recommendations:

The FEIS should include additional discussion, and if possible, quantification of the shading benefits of Alternative 4/d and consider the feasibility of modifying alternatives 2A/B and 2B/d to add trees to reduce the temperature of Berryessa Creek.

Cumulative Impacts

NEPA requires the evaluation of cumulative impacts that are reasonably foreseeable [40 CFR 1508.8]. The DEIS analyzed two alternatives, 2B/d and 4/d, that modeled a bypass channel upstream of Interstate 680 and the DEIS project area (p. 3-50). The bypass is a potential project of the Santa Clara Valley Water District, the local project sponsor for the Berryessa Creek Project. It would convey water around the Greenbelt Reach to alleviate flooding in the upper watershed (3-53). Given the modeling prepared to support it, the upstream bypass appears to be reasonably foreseeable project that could result in cumulative impacts that should have been described in greater detail in the DEIS.

The Santa Clara Valley Water District also investigated floodplain terrace and native riparian revegetation of the Greenbelt Reach as a way to provide flood protection and mitigation within the Greenbelt Reach. It was the focus of coordinated agency comments by EPA and the San Francisco Bay Regional Water Quality Control Board (RWQCB) in support of a terracing and revegetation approach at the Corps' Upper Berryessa F4A conference held on August 17, 2006. At that time, it was also considered a potential element of the Corps' Berryessa Creek Project. While we understand the reason that flood control measures upstream of I-680 were not considered in the DEIS (i.e., the Corps' "800 cfs rule" and the lack of economic justification, p. 3-47 and 3-48), we seek to ensure that the Corps' project will not preclude Greenbelt terracing and revegetation, which EPA and RWQCB have supported.

Recommendation:

The FEIS should discuss the cumulative impacts of the Greenbelt bypass, and clarify whether any of the project alternatives would preclude floodplain terracing and riparian revegetation of the Greenbelt Reach.

Groundwater Contamination

The DEIS acknowledges Jones Chemical Company and Great Western Chemical Company as sources of hazardous, toxic and radiologic waste. Based on discussions with the RWQCB, the Corps is likely to encounter contamination from the Jones Chemical site[3]. While the DEIS discusses the potential to encounter contamination from these sites (5-19), and mentions the preparation of Best Management Plans to minimize impacts, it provides no discussion of treatment technologies, permitting requirements, appropriate discharge limits nor reuse potential (e.g. dust control). Without adequate preparation, unexpectedly encountering contaminated groundwater during de-watering could cause project delays and

[3] Person communication between Mark Johnson, RWQCB, San Francisco Bay and Tom Kelly, U.S. EPA, on April 11, 2013.

cost increases. Additionally, dewatering wells could draw contaminated groundwater away from remediation wells designed to contain the plume.

> *Recommendations:*
> The Army Corps should coordinate closely with the Regional Water Quality Control Board, so that dewatering does not unexpectedly withdraw contaminated groundwater nor expand the plume beyond the control of wells designed to control contaminant migration.
>
> The FEIS should include Best Management Plans for the treatment and discharge of contaminated groundwater, or an outline of the plan that would be developed later.
>
> The FEIS should discuss requirements for treatment and discharge of contaminated groundwater.
>
> The FEIS should clearly describe the circumstances under which potentially contaminated soil would be sampled, and contaminated soil would be managed as hazardous waste rather than redeposited in levees or the adjacent road base.

Permanent Impacts

The DEIS included more discussion of the construction impacts than operational impacts of the project. As the DEIS frequently noted, construction impacts are temporary, so an added focus on operational impacts may be more informative for the Corp's decision-maker.

> *Recommendation:*
> The FEIS should expand the discussion of permanent impacts, such as sediment loading, nutrient loading, temperature, and stream velocities, particularly where more detailed information is available in appendices.

The Environmentally Preferred Alternative

The DEIS selects Alternative 2A/d as the environmental preferred (and environmentally superior under CEQA) alternative (p. 5-68), but includes no discussion of the relative magnitude of benefits and adverse effects (e.g. temperature, sediment loading and maintenance) of each alternative.

> *Recommendation:*
> The FEIS should explain the basis for the selection of Alternative 2A/d as the environmentally preferred alternative.

Tree Removal and Mitigation

The DEIS discusses the need for tree removal (e.g. p. 3-24). Because Berryessa Creek is a water of the state, the Regional Board may require mitigation when trees are shading the creek, which does not appear to be discussed. The DEIS does describe the Corps Levee Vegetation Management Policy on page 3-48, which requires a "15-foot vegetation-free

zone outside of the proposed levee toes or floodwalls." The levee vegetation policy potentially conflicts with, or limits, opportunities to mitigate tree removals along the creek.

> *Recommendations :*
> Discuss, in the FEIS, the impact of the Levee Vegetation Management Policy on the Corps' obligations to mitigate tree removals and other impacts that increase water temperature.
>
> Identify, in the FEIS, trees to be removed as part of the project, for which mitigation of the removal would be required by state or local regulations.

Maintenance

One of the goals of the project is reducing maintenance following project construction (p. 1-1). Current maintenance is described as "sediment removal activities designed to restore flood conveyance capacity, vegetation management in and around streams and canals, and bank protection" (p. 4-30). While Table 6-11 lists the annual maintenance costs for each alternative, the DEIS does not specify the activities associated with the maintenance costs. It does explain that Alternatives 2A/d and 2B/d include an access road built inside levees and floodwalls (p. 3-51 and 3-53), making maintenance less expensive (p. 3-57), but the DEIS does not clarify the reason maintenance of Alternative 2A/d is less than Alternative 2B/d. Additionally, Alternative 4 includes 15-foot vegetation-free zones on the outside of both floodwalls, which would allow relatively easy access for maintenance. While the road inside the levee would allow for easy access, it likely would result in additional costs, because the road could be overtopped as frequently as once every 10 years (0.1 to 0.04 exceedance probability, p. 3-53).

> *Recommendation:*
> The FEIS should include a breakdown of maintenance activities, frequency, extent and costs, as well as any assumptions used to estimate costs.

Air Quality

We acknowledge that the air quality impacts of the NED Plan, Alternative A2/d, are less than significant, and the DEIS includes a thorough list of mitigation measures addressing air quality (p. 5-9 to 5-11). The Corps could further reduce the project's emissions and possibly reduce complaints through careful planning and the use of clean diesel equipment meeting the most stringent of applicable Federal[4] or State Standards[5].

> *Recommendations:*
> Commit, in the FEIS, to:
>
> - Request that bidding construction contractors provide information on emissions from construction equipment (e.g. Tier 3 off-road diesel engines or engines retrofitted to meet equivalent emissions) and give preference

[4] EPA's website for nonroad mobile sources is http://www.epa.gov/nonroad/.
[5] For ARB emissions standards, see: http://www.arb.ca.gov/msprog/offroad/offroad.htm.

(among other factors such as low cost) to contractors employing clean construction fleets.

- Avoid the use of portable generators where power can be practically obtained from the local power grid.

- Develop a construction traffic and parking management plan that minimizes traffic interference and maintains traffic flow.

Include, in the FEIS, a map of the sensitive receptors mentioned in the DEIS, and commit to locate operating construction equipment and staging zones away from these sensitive receptors (e.g. the opposite side of the creek), to the extent practicable.

Editorial Note

Several pages (e.g. 3-55) include a note at the top stating, "[t]he information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines. It has not been formally disseminated by the Corps. It does not represent and should not be construed to represent any agency determination or policy." This note should be removed from the FEIS.

Appendix B Air Quality Model Data Sheets

Road Construction Emissions Model, Version 7.1.5.1

Emission Estimates for -> Berryessa 2A/2A+ R123				Total	Exhaust	Fugitive Dust	Total	Exhaust	Fugitive Dust	
Project Phases (English Units)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	PM10 (lbs/day)	PM10 (lbs/day)	PM10 (lbs/day)	PM2.5 (lbs/day)	PM2.5 (lbs/day)	PM2.5 (lbs/day)	CO2 (lbs/day)
Grubbing/Land Clearing	2.2	12.3	17.7	20.8	0.8	20.0	4.9	0.8	4.2	2,263.1
Grading/Excavation	8.9	48.1	99.2	24.5	4.5	20.0	8.2	4.0	4.2	12,526.5
Drainage/Utilities/Sub-Grade	7.3	38.7	66.8	23.6	3.6	20.0	7.4	3.3	4.2	7,614.6
Paving	3.4	19.1	26.0	1.7	1.7	-	1.6	1.6	-	3,384.1
Maximum (pounds/day)	8.9	48.1	99.2	24.5	4.5	20.0	8.2	4.0	4.2	12,526.5
Total (tons/construction project)	0.9	4.9	9.1	2.7	0.4	2.2	0.9	0.4	0.5	1,110.1

Notes: Project Start Year -> 2017
Project Length (months) -> 12
Total Project Area (acres) -> 19
Maximum Area Disturbed/Day (acres) -> 2
Total Soil Imported/Exported (yd^3/day)-> 417

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sum of exhaust and fugitive dust emissions shown in columns K and L.

Emission Estimates for -> Berryessa 2A/2A+ R123				Total	Exhaust	Fugitive Dust	Total	Exhaust	Fugitive Dust	
Project Phases (Metric Units)	ROG (kgs/day)	CO (kgs/day)	NOx (kgs/day)	PM10 (kgs/day)	PM10 (kgs/day)	PM10 (kgs/day)	PM2.5 (kgs/day)	PM2.5 (kgs/day)	PM2.5 (kgs/day)	CO2 (kgs/day)
Grubbing/Land Clearing	1.0	5.6	8.0	9.5	0.4	9.1	2.2	0.3	1.9	1,028.7
Grading/Excavation	4.0	21.9	45.1	11.1	2.0	9.1	3.7	1.8	1.9	5,693.9
Drainage/Utilities/Sub-Grade	3.3	17.6	30.4	10.7	1.6	9.1	3.4	1.5	1.9	3,461.2
Paving	1.6	8.7	11.8	0.8	0.8	-	0.7	0.7	-	1,538.2
Maximum (kilograms/day)	4.0	21.9	45.1	11.1	2.0	9.1	3.7	1.8	1.9	5,693.9
Total (megagrams/construction project)	0.8	4.4	8.2	2.4	0.4	2.0	0.8	0.4	0.4	1,006.9

Notes: Project Start Year -> 2017
Project Length (months) -> 12
Total Project Area (hectares) -> 8
Maximum Area Disturbed/Day (hectares) -> 1
Total Soil Imported/Exported ($meters^3$/day)-> 319

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sume of exhaust and fugitive dust emissions shown in columns K and L.

Road Construction Emissions Model, Version 7.1.5.1

Emission Estimates for -> Berryessa 2A/2A+ R4 Project Phases (English Units)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	CO2 (lbs/day)
Grubbing/Land Clearing	1.8	10.6	16.4	20.7	0.7	20.0	4.8	0.7	4.2	2,016.8
Grading/Excavation	8.2	44.3	88.2	24.2	4.2	20.0	8.0	3.8	4.2	9,814.8
Drainage/Utilities/Sub-Grade	6.9	35.8	65.3	23.5	3.5	20.0	7.3	3.2	4.2	7,052.1
Paving	3.0	16.5	24.6	1.6	1.6	-	1.5	1.5	-	2,890.8
Maximum (pounds/day)	8.2	44.3	88.2	24.2	4.2	20.0	8.0	3.8	4.2	9,814.8
Total (tons/construction project)	0.8	4.5	8.4	2.7	0.4	2.2	0.9	0.4	0.5	927.9

Notes:

Project Start Year ->	2017
Project Length (months) ->	12
Total Project Area (acres) ->	10
Maximum Area Disturbed/Day (acres) ->	2
Total Soil Imported/Exported (yd^3/day)->	105

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sum of exhaust and fugitive dust emissions shown in columns K and L.

Emission Estimates for -> Berryessa 2A/2A+ R4 Project Phases (Metric Units)	ROG (kgs/day)	CO (kgs/day)	NOx (kgs/day)	Total PM10 (kgs/day)	Exhaust PM10 (kgs/day)	Fugitive Dust PM10 (kgs/day)	Total PM2.5 (kgs/day)	Exhaust PM2.5 (kgs/day)	Fugitive Dust PM2.5 (kgs/day)	CO2 (kgs/day)
Grubbing/Land Clearing	0.8	4.8	7.4	9.4	0.3	9.1	2.2	0.3	1.9	916.7
Grading/Excavation	3.7	20.1	40.1	11.0	1.9	9.1	3.6	1.7	1.9	4,461.3
Drainage/Utilities/Sub-Grade	3.1	16.3	29.7	10.7	1.6	9.1	3.3	1.4	1.9	3,205.5
Paving	1.4	7.5	11.2	0.7	0.7	-	0.7	0.7	-	1,314.0
Maximum (kilograms/day)	3.7	20.1	40.1	11.0	1.9	9.1	3.6	1.7	1.9	4,461.3
Total (megagrams/construction project)	0.8	4.0	7.6	2.4	0.4	2.0	0.8	0.3	0.4	841.6

Notes:

Project Start Year ->	2017
Project Length (months) ->	12
Total Project Area (hectares) ->	4
Maximum Area Disturbed/Day (hectares) ->	1
Total Soil Imported/Exported (meters^3/day)->	80

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sume of exhaust and fugitive dust emissions shown in columns K and L.

Road Construction Emissions Model, Version 7.1.5.1

Emission Estimates for -> Berryessa 2B R123 Project Phases (English Units)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	CO2 (lbs/day)
Grubbing/Land Clearing	2.2	12.3	17.7	20.8	0.8	20.0	4.9	0.8	4.2	2,263.1
Grading/Excavation	8.9	48.4	102.2	24.6	4.6	20.0	8.2	4.0	4.2	13,188.5
Drainage/Utilities/Sub-Grade	7.3	38.7	66.8	23.6	3.6	20.0	7.4	3.3	4.2	7,614.6
Paving	3.4	19.1	26.0	1.7	1.7	-	1.6	1.6	-	3,384.1
Maximum (pounds/day)	8.9	48.4	102.2	24.6	4.6	20.0	8.2	4.0	4.2	13,188.5
Total (tons/construction project)	0.9	4.9	9.2	2.7	0.5	2.2	0.9	0.4	0.5	1,145.0

Notes: Project Start Year -> 2017
Project Length (months) -> 12
Total Project Area (acres) -> 19
Maximum Area Disturbed/Day (acres) -> 2
Total Soil Imported/Exported (yd^3/day)-> 514

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sum of exhaust and fugitive dust emissions shown in columns K and L.

Emission Estimates for -> Berryessa 2B R123 Project Phases (Metric Units)	ROG (kgs/day)	CO (kgs/day)	NOx (kgs/day)	Total PM10 (kgs/day)	Exhaust PM10 (kgs/day)	Fugitive Dust PM10 (kgs/day)	Total PM2.5 (kgs/day)	Exhaust PM2.5 (kgs/day)	Fugitive Dust PM2.5 (kgs/day)	CO2 (kgs/day)
Grubbing/Land Clearing	1.0	5.6	8.0	9.5	0.4	9.1	2.2	0.3	1.9	1,028.7
Grading/Excavation	4.1	22.0	46.4	11.2	2.1	9.1	3.7	1.8	1.9	5,994.8
Drainage/Utilities/Sub-Grade	3.3	17.6	30.4	10.7	1.6	9.1	3.4	1.5	1.9	3,461.2
Paving	1.6	8.7	11.8	0.8	0.8	-	0.7	0.7	-	1,538.2
Maximum (kilograms/day)	4.1	22.0	46.4	11.2	2.1	9.1	3.7	1.8	1.9	5,994.8
Total (megagrams/construction project)	0.8	4.4	8.4	2.4	0.4	2.0	0.8	0.4	0.4	1,038.6

Notes: Project Start Year -> 2017
Project Length (months) -> 12
Total Project Area (hectares) -> 8
Maximum Area Disturbed/Day (hectares) -> 1
Total Soil Imported/Exported ($meters^3$/day)-> 393

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sume of exhaust and fugitive dust emissions shown in columns K and L.

Road Construction Emissions Model, Version 7.1.5.1

Emission Estimates for -> Berryessa 2B R4 Project Phases (English Units)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	CO2 (lbs/day)
Grubbing/Land Clearing	1.8	10.6	16.4	20.7	0.7	20.0	4.8	0.7	4.2	2,016.8
Grading/Excavation	8.2	44.4	89.3	24.2	4.2	20.0	8.0	3.8	4.2	10,067.4
Drainage/Utilities/Sub-Grade	6.9	35.8	65.3	23.5	3.5	20.0	7.3	3.2	4.2	7,052.1
Paving	3.0	16.5	24.6	1.6	1.6	-	1.5	1.5	-	2,890.8
Maximum (pounds/day)	8.2	44.4	89.3	24.2	4.2	20.0	8.0	3.8	4.2	10,067.4
Total (tons/construction project)	0.8	4.5	8.4	2.7	0.4	2.2	0.9	0.4	0.5	941.2

Notes: Project Start Year -> 2017
Project Length (months) -> 12
Total Project Area (acres) -> 10
Maximum Area Disturbed/Day (acres) -> 2
Total Soil Imported/Exported (yd^3/day)-> 142

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sum of exhaust and fugitive dust emissions shown in columns K and L.

Emission Estimates for -> Berryessa 2B R4 Project Phases (Metric Units)	ROG (kgs/day)	CO (kgs/day)	NOx (kgs/day)	Total PM10 (kgs/day)	Exhaust PM10 (kgs/day)	Fugitive Dust PM10 (kgs/day)	Total PM2.5 (kgs/day)	Exhaust PM2.5 (kgs/day)	Fugitive Dust PM2.5 (kgs/day)	CO2 (kgs/day)
Grubbing/Land Clearing	0.8	4.8	7.4	9.4	0.3	9.1	2.2	0.3	1.9	916.7
Grading/Excavation	3.7	20.2	40.6	11.0	1.9	9.1	3.6	1.7	1.9	4,576.1
Drainage/Utilities/Sub-Grade	3.1	16.3	29.7	10.7	1.6	9.1	3.3	1.4	1.9	3,205.5
Paving	1.4	7.5	11.2	0.7	0.7	-	0.7	0.7	-	1,314.0
Maximum (kilograms/day)	3.7	20.2	40.6	11.0	1.9	9.1	3.6	1.7	1.9	4,576.1
Total (megagrams/construction project)	0.8	4.1	7.7	2.4	0.4	2.0	0.8	0.3	0.4	853.7

Notes: Project Start Year -> 2017
Project Length (months) -> 12
Total Project Area (hectares) -> 4
Maximum Area Disturbed/Day (hectares) -> 1
Total Soil Imported/Exported (meters^3/day)-> 109

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sume of exhaust and fugitive dust emissions shown in columns K and L.

Road Construction Emissions Model, Version 7.1.5.1

Emission Estimates for -> Berryessa 4 R123				Total	Exhaust	Fugitive Dust	Total	Exhaust	Fugitive Dust	
Project Phases (English Units)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	PM10 (lbs/day)	PM10 (lbs/day)	PM10 (lbs/day)	PM2.5 (lbs/day)	PM2.5 (lbs/day)	PM2.5 (lbs/day)	CO2 (lbs/day)
Grubbing/Land Clearing	2.2	12.3	17.7	20.8	0.8	20.0	4.9	0.8	4.2	2,263.1
Grading/Excavation	9.0	48.9	107.9	24.7	4.7	20.0	8.3	4.1	4.2	14,471.6
Drainage/Utilities/Sub-Grade	7.3	38.7	66.8	23.6	3.6	20.0	7.4	3.3	4.2	7,614.6
Paving	3.4	19.1	26.0	1.7	1.7	-	1.6	1.6	-	3,384.1
Maximum (pounds/day)	9.0	48.9	107.9	24.7	4.7	20.0	8.3	4.1	4.2	14,471.6
Total (tons/construction project)	0.9	4.9	9.5	2.7	0.5	2.2	0.9	0.4	0.5	1,212.8

Notes: Project Start Year -> 2017

Project Length (months) -> 12

Total Project Area (acres) -> 19

Maximum Area Disturbed/Day (acres) -> 2

Total Soil Imported/Exported (yd^3/day)-> 702

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sum of exhaust and fugitive dust emissions shown in columns K and L.

Emission Estimates for -> Berryessa 4 R123				Total	Exhaust	Fugitive Dust	Total	Exhaust	Fugitive Dust	
Project Phases (Metric Units)	ROG (kgs/day)	CO (kgs/day)	NOx (kgs/day)	PM10 (kgs/day)	PM10 (kgs/day)	PM10 (kgs/day)	PM2.5 (kgs/day)	PM2.5 (kgs/day)	PM2.5 (kgs/day)	CO2 (kgs/day)
Grubbing/Land Clearing	1.0	5.6	8.0	9.5	0.4	9.1	2.2	0.3	1.9	1,028.7
Grading/Excavation	4.1	22.2	49.1	11.2	2.1	9.1	3.8	1.9	1.9	6,578.0
Drainage/Utilities/Sub-Grade	3.3	17.6	30.4	10.7	1.6	9.1	3.4	1.5	1.9	3,461.2
Paving	1.6	8.7	11.8	0.8	0.8	-	0.7	0.7	-	1,538.2
Maximum (kilograms/day)	4.1	22.2	49.1	11.2	2.1	9.1	3.8	1.9	1.9	6,578.0
Total (megagrams/construction project)	0.8	4.5	8.6	2.5	0.4	2.0	0.8	0.4	0.4	1,100.0

Notes: Project Start Year -> 2017

Project Length (months) -> 12

Total Project Area (hectares) -> 8

Maximum Area Disturbed/Day (hectares) -> 1

Total Soil Imported/Exported ($meters^3$/day)-> 537

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sume of exhaust and fugitive dust emissions shown in columns K and L.

Road Construction Emissions Model, Version 7.1.5.1

Emission Estimates for -> Berryessa 4 R4				Total	Exhaust	Fugitive Dust	Total	Exhaust	Fugitive Dust	
Project Phases (English Units)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	PM10 (lbs/day)	PM10 (lbs/day)	PM10 (lbs/day)	PM2.5 (lbs/day)	PM2.5 (lbs/day)	PM2.5 (lbs/day)	CO2 (lbs/day)
Grubbing/Land Clearing	1.8	10.6	16.4	20.7	0.7	20.0	4.8	0.7	4.2	2,016.8
Grading/Excavation	8.3	44.5	90.0	24.2	4.2	20.0	8.0	3.8	4.2	10,217.5
Drainage/Utilities/Sub-Grade	6.9	35.8	65.3	23.5	3.5	20.0	7.3	3.2	4.2	7,052.1
Paving	3.0	16.5	24.6	1.6	1.6	-	1.5	1.5	-	2,890.8
Maximum (pounds/day)	8.3	44.5	90.0	24.2	4.2	20.0	8.0	3.8	4.2	10,217.5
Total (tons/construction project)	0.8	4.5	8.5	2.7	0.4	2.2	0.9	0.4	0.5	949.2

Notes: Project Start Year -> 2017
Project Length (months) -> 12
Total Project Area (acres) -> 10
Maximum Area Disturbed/Day (acres) -> 2
Total Soil Imported/Exported (yd^3/day)-> 164

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sum of exhaust and fugitive dust emissions shown in columns K and L.

Emission Estimates for -> Berryessa 4 R4				Total	Exhaust	Fugitive Dust	Total	Exhaust	Fugitive Dust	
Project Phases (Metric Units)	ROG (kgs/day)	CO (kgs/day)	NOx (kgs/day)	PM10 (kgs/day)	PM10 (kgs/day)	PM10 (kgs/day)	PM2.5 (kgs/day)	PM2.5 (kgs/day)	PM2.5 (kgs/day)	CO2 (kgs/day)
Grubbing/Land Clearing	0.8	4.8	7.4	9.4	0.3	9.1	2.2	0.3	1.9	916.7
Grading/Excavation	3.8	20.2	40.9	11.0	1.9	9.1	3.6	1.7	1.9	4,644.3
Drainage/Utilities/Sub-Grade	3.1	16.3	29.7	10.7	1.6	9.1	3.3	1.4	1.9	3,205.5
Paving	1.4	7.5	11.2	0.7	0.7	-	0.7	0.7	-	1,314.0
Maximum (kilograms/day)	3.8	20.2	40.9	11.0	1.9	9.1	3.6	1.7	1.9	4,644.3
Total (megagrams/construction project)	0.8	4.1	7.7	2.4	0.4	2.0	0.8	0.4	0.4	860.9

Notes: Project Start Year -> 2017
Project Length (months) -> 12
Total Project Area (hectares) -> 4
Maximum Area Disturbed/Day (hectares) -> 1
Total Soil Imported/Exported ($meters^3$/day)-> 125

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sume of exhaust and fugitive dust emissions shown in columns K and L.

Appendix C Wetlands/Other Waters of the U.S./Waters of the State Delineation Report

UPPER BERRYESSA CREEK
FLOOD RISK MANAGEMENT PROJECT
SANTA CLARA COUNTY, CALIFORNIA

WETLANDS/OTHER WATERS OF THE U.S./WATERS OF THE STATE
DELINEATION REPORT

PREPARED FOR:

Santa Clara Valley Water District

Prepared by:

TETRA TECH

In compliance with Subtask 2.2 of Agreement A3740G dated July 1, 2014

April 2015

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APPENDICES

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A. PROJECT BACKGROUND AND OBJECTIVES

The Upper Berryessa Creek Flood Control Project, sponsored by the U.S. Army Corps of Engineers and the Santa Clara Valley Water District (SCVWD), would provide improved flood protection along a 2.1-mile stretch of Berryessa Creek between Interstate 680 and Calaveras Blvd (Appendix A, Figure 1). Improvements would include a larger channel with greater capacity, increased flow capacity through culverts, and raised floodwalls in place of levees in certain locations. Construction would occur over two years, with in-channel construction occurring during the dry season of April through October. Because components of the proposed project will occur within the Berryessa Creek stream channel, there is potential for impacts on Wetlands and Other Waters of the U.S. and stream components under the jurisdiction of the California Department of Fish and Wildlife (CDFW).

The goal of this Wetlands/Waters of the U.S./Waters of the State delineation is to update the Wetlands Delineation Report for the larger Berryessa Creek Project prepared by the U.S. Army Corps of Engineers in April 2005 (USACE 2005a) and document resources in the survey area that may fall under the jurisdiction of the U.S. Army Corps of Engineers (USACE), the Regional Water Quality Control Board (RWQCB), or the California Department of Fish and Wildlife (CDFW). The 2005 delineation identified two relatively small patches of wetlands and reported the balance of the area as being Waters of the United States (WoUS). One of the key differences between the 2005 delineation report and this report is that the 2005 delineation report was prepared before the Regional Supplement (Arid West Region) (USACE 2008) was published, whereas the current report reflects guidance in the Regional Supplement. Therefore, methods for gathering and reporting wetlands/waters data are different between the two reports. Also, the original delineation report included a much longer stretch of stream than the current report, and assessed the stretch of stream from Old Piedmont Road to about 50' downstream of Calaveras Blvd. The survey area includes the stream bed and banks, extending laterally to the upland edge of riparian vegetation supported by the stream. Key outcomes of this survey and report include the delineation of all wetlands present, and establishing classification and rating based on functions and values. Other Waters of the U.S. are also identified by establishing ordinary high water marks (OHWM), and classified according to their characteristics, function, and value. Stream waters falling under the jurisdiction of RWQCB and CDFW are established using similar parameters but may extend beyond the limits of federal jurisdiction.

B. SITE DESCRIPTION AND LANDSCAPE SETTING

Upper Berryessa Creek is located in the South San Francisco Bay area of California, in Santa Clara County, California, and is a tributary to Lower Berryessa Creek, Lower Penitencia Creek, and Coyote Creek, which ultimately flow into the southern end of San Francisco Bay. The Berryessa Creek watershed is about 22 square miles, draining the east side of Santa Clara Valley. Appendix A, Figure 1, provides the project vicinity and location. It includes Los Coches Creek and Piedmont Creek, which enter Upper Berryessa Creek approximately 800 feet and 2400 feet upstream of Calaveras Boulevard, which marks the downstream end of the project area. The lowermost 400 feet of Los Coches Creek and the lowermost 80 feet of Piedmont Creek are included in the project area and are assessed in this report.

The headwaters of Berryessa Creek are located in the Los Buellis Hills of the Diablo Range. Once the creek leaves the foothills of the Diablo Range, it flows through the Cities of San Jose and Milpitas, eventually making its way to San Francisco Bay. Previous flood control efforts and adjacent development

have significantly altered Upper Berryessa Creek. Levees and concrete-lined portions of the stream channel have resulted in significant modification and channelization (Appendix C, Photos 1 and 2, please note that photos are presented in the Appendix in the order referenced herein). The creek flows through numerous culverts at road crossings and the gradient is controlled by several engineered drop structures. Upper Berryessa Creek is identified as an intermittent blue-line water by the U.S. Geological Survey (USGS) National Hydrography Dataset (NHD) (USGS 2014) Upper Berryessa Creek flows throughout its length during the rainy season, especially after heavy rainfalls. Portions of the creek may retain water throughout the year as a result of summer runoff from urban areas. Upper Berryessa Creek is not tidally influenced, nor does it generally contain common wetland characteristics. Rather, it functions more as a riverine system, therefore characteristics of jurisdictional waters within the stream are more typical of a riverine system than an emergent wetland system.

The project area is surrounded by residential and commercial development and encompasses a 2.1 mile length of Upper Berryessa Creek (Appendix C, Photo 3), beginning on the west side of Interstate Highway 680, and ending about 50 feet downstream of Calaveras Boulevard. Two tributaries merge with Berryessa Creek within the project area: Arroyo De Los Coches and Piedmont Creek (USGS 2014). The Section, Township, and Range for the project area is Mount Diablo Meridian T6S, R1E, Sections 5, 8, and 17.

For the purposes of the proposed project, the project area has been divided into four reaches (Appendix A, Figure 1). From downstream to upstream, Reach 1 extends from 50 feet downstream of Calaveras Boulevard to Los Coches Creek, Reach 2 is from Los Coches Creek to Piedmont Creek, Reach 3 is from Piedmont Creek to Montague Expressway, and Reach 4 is from Montague Expressway to Interstate Highway 680.

C. EXISTING CONDITIONS

Vegetation

Vegetation in the proposed project area is highly disturbed, and species composition varies by location relative to the active channel, but retains a relatively uniform composition throughout the length of the system. Three plant community types are present in the survey area, including (1) open water/aquatic, (2) fringing wetland, and (3) herb-dominated upland. All plant communities are dominated by exotic species, are highly disturbed, and are of low quality (Appendix C, Photo 4). The SCVWD actively maintains the vegetation within the project area to ensure sufficient hydrologic conveyance. Maintenance practices include mechanical removal of vegetation and sediment from the bottom of the channel and the use of herbicides on the creek banks. Frequent spraying or mowing of creek bank vegetation prevents the establishment of woody riparian species as well as succession of vegetation types. Flashy winter flows move through the channelized system and scour vegetation from the active stream channel. Tree species are occasionally present within the survey area, primarily along levee roads and within 25 feet from top of bank, but have higher densities in adjacent areas outside of the proposed project footprint. Vegetation is much denser in Reaches 1 and 2, downstream of Piedmont Creek. The vegetation present in each reach is discussed below.

Reach 1 (Downstream of Calaveras Boulevard)

Reach 1, where it extends 50 feet downstream of Calaveras Boulevard, has the least-disturbed vegetation despite being in a highly managed area (Appendix C, Photos 5 and 6). This is likely due to the presence of flowing water and a wider, split channel morphology. In-channel vegetation is dominated by

wetland grasses and forbs including tall flatsedge (*Cyperus eragrostis*), spotted lady's thumb (*Polygonum persicaria*), willow smartweed (*P. lapathifolium*), American brooklime (*Veronica americana*), barnyard grass (*Echinochloa* sp.), and common cattail (*Typha latifolia*). Aquatic species include Gila River water hyssop (*Bacopa eisenii*) and watercress (*Rorippa nasturtium-aquaticum*). Upslope of the OHWM, common species include wild radish (*Raphanus sativus*), and giant horsetail (*Equisetum telmateia*). The surrounding upland community is maintained and consists of weedy non-woody species such as black mustard (*Brassica nigra*), cheeseweed mallow (*Malva parviflora*), wild oat (*Avena fatua*), ripgut brome (*Bromus diandrus*), rescue grass (*Bromus catharticus*), and tumbleweed (*Amaranthus albus*). The only tree in this portion of Reach 1 is a single Peruvian peppertree (*Schinus molle*).

Reach 1 (Upstream of Calaveras Boulevard)

Reach 1, upstream of Calaveras Boulevard, is very similar to the adjoining downstream portion of the reach, with the exception that it is generally more channelized, narrow, and subsequently hosts only a thin fringing wetland along the creek channel (Appendix C, Photo 7). Species assemblages are also similar but the fringing wetland is dominated by the more weedy species such as spotted lady's thumb, American brooklime, barnyard grass, and rough cocklebur (*Xanthium strumarium*). Other vegetation communities are the same between the two portions of Reach 1.

Reach 2

Reach 2 is very similar to Reach 1 except that it has an even narrower channel, steeper stream banks, and a narrower fringing wetland along the creek channel (Appendix C, Photo 8). Although the species assemblage in the fringing wetland here is similar to Reach 1, plant densities are lower. One patch of red willow (*Salix laevigata*) saplings is present. The aquatic floating water primrose (*Ludwigia peploides*), is present in high density patches near the downstream end of Reach 2. Algae are ubiquitous in areas of open water, and likely due to slow flow through this reach. Patches of Himalayan blackberry (*Rubus armeniacus*) are present in the upland areas. Upland vegetation is the same as in Reach 1.

Reach 3

Reach 3 is located upstream of the confluence with Piedmont Creek and is mostly out of its hydrologic influence. With the exception of the downstream end and some isolated depressions, surface water was absent during the survey. The limited hydrology in Reach 3 reduces the extent of fringing wetland, and substantially reduces its distribution and density along much of its length (Appendix C, Photo 4). Where fringing wetland (and hydrology) are present, the same species assemblage and density is present as in Reach 2. Upstream, the dry open channel is very narrow and dominated by gravel and cobble with limited fringing wetland species present. Upland plants extend along the steep, highly incised channel slopes into the active stream channel in some areas.

Reach 4

Reach 4 is similar to the dry, upstream portion of Reach 3, and hosts primarily weedy upland species, very few fringing wetland species, and no aquatic species (Appendix C, Photos 1 and 9). Trees are present on the edge of the channel in places and include coast live oak (*Quercus agrifolia*), holly oak (*Q. ilex*), Fremont cottonwood (*Populus fremontii*), and elm (*Ulmus* sp.). The majority of the plants present are the same non-woody weedy upland species observed in all other reaches. Little vegetation is present where the channel is concrete lined, and only includes weedy upland species.

Los Coches Creek

Because Los Coches Creek is an intermittent stream and generally has flow only during and shortly after rain events, conditions are similar to those in Reach 3 upstream of the Piedmont Creek confluence. An

unvegetated low-flow channel approximately 2 feet wide occurs in this reach of Los Coches Creek, and the sparse vegetation found in the bed of the stream is similar to vegetation on the banks. Most of the vegetation is not hydrophytic. It is assumed that soils are similar to those in Upper Berryessa Creek and do not show hydric characteristics.

Piedmont Creek

Piedmont Creek has perennial flow and provides perennial flow to Upper Berryessa Creek downstream of Ames Avenue. Vegetation communities in Piedmont Creek are similar to those found in Reaches 1 and 2, and a short stretch of Reach 3, and include wetland plant communities found between the low-flow channel and the banks. The banks support upland plant communities starting at or below the OHWM.

Soils

The soil survey report of the survey area (NRCS 1903, 2014b) indicates that four soil types (i.e., map units) are present in the survey area; all are Urban land. The soil types are discussed below; a map and additional details of the soils within and around the survey site is provided in Appendix A, Figure 2; hydric ratings are also provided.

- ***Urban land-Flaskan complex, 0 to 2 percent slopes (140)***: The Urban land component makes up 70 percent of the map unit; the remaining 30 percent is composed of the minor components; Flaskan and similar soils (20 percent), and other minor components (10 percent). Slopes are 0 to 2 percent and the Urban land component is found on alluvial fans. The parent material consists of disturbed and human-transported material, and ranges in texture from sandy loam at the surface to gravelly sandy clay loam from 17 to 31 inches. Depth to a root restrictive layer is more than 80 inches, and the natural drainage class is well drained. Water movement in the most restrictive layer is moderately high (0.20 to 0.57 in/hr). This soil has no flooding or ponding frequency. Neither the soils major component nor minor components meet hydric criteria (NRCS 2014c). Urban land-Flaskan complex, 0 to 2 percent slopes comprises approximately 31 percent of the survey area and is mostly distributed in Reach 3.
- ***Urban land-Hangerone complex, 0 to 2 percent slopes, drained (145)***: The Urban land component makes up 70 percent of the map unit; the remaining 30 percent is composed of the minor components; Hangerone, drained, and similar soils (25 percent), and other minor components (5 percent). Characteristics of the major component; Urban land, are the same as those described above. Although Urban land does not meet hydric criteria, minor components: Hangerone, drained, Bayshore, Clear Lake, and Embarcadero are hydric (NRCS 2014c). Urban land-Hangerone complex, 0 to 2 percent slopes comprises approximately 36 percent of the survey area and is mostly distributed in Reach 1 and 2.
- ***Urban land-Campbell complex, 0 to 2 percent slopes, protected (165)***: The Urban land component makes up 65 percent of the map unit; the remaining 35 percent is composed of the minor components; Clear Lake and similar soils (25 percent), and other minor components (10 percent). Characteristics of the major component; Urban land, are the same as those described above. Although Urban land does not meet hydric criteria, the minor component Clear Lake is hydric (NRCS 2014c). Urban land-Campbell complex, 0 to 2 percent slopes, protected comprises approximately 3 percent of the survey area and is confined to a narrow zone in Reach 1.
- ***Urban land-Cropley complex, 0 to 2 percent slopes (317)***: The Urban land component makes up 75 percent of the map unit; the remaining 25 percent is composed of the minor components;

Cropley and similar soils. Characteristics of the major component; Urban land, are the same as those described above. Neither the soils major component nor minor components meet hydric criteria (NRCS 2014c). Urban land-Cropley complex, 0 to 2 percent slopes comprises approximately 30 percent of the survey area and is mostly distributed in Reach 3 and 4.

Hydrology

Water generally moves down-gradient from the south to the north, and takes the forms of groundwater and surface water when present. The existing hydrologic regime has been highly altered from the surrounding hardscaped urban environment and alterations of the stream channel designed to efficiently convey flow (Appendix C, Photos 1 and 3). These conditions result in surface water existing only as punctuated flows during the wet season or as artificial inputs from the urban environment during the dry season. Numerous storm drains empty into the system, which is surrounded by impervious and compacted surfaces.

D. PRECIPITATION DATA AND ANALYSIS

The delineation was performed on two days in late summer: 25 and 26 of August 2014. Wetland climate data (WETS), which provides normal ranges of monthly precipitation (including 30 percent average ranges) was obtained for the survey area from NRCS (2014a), as well as measured monthly totals for June through August 2014 (NOAA 2014). Because the field work occurred at the end of the month, August is considered a "preceding month" in this analysis. Preliminary daily precipitation summary data for the field survey interval was also obtained (NRCS 2014a; generated by ACIS-NOAA Regional Climate Centers). The nearest NOAA Climatological Station to the survey site was San Jose (CA293), California (NOAA 2014), located approximately five miles to the southwest.

Field work was conducted during a typical summer with dry conditions (Table 1). Of the 3 months preceding the delineation; June, July, and August, functionally no precipitation occurred, which corresponds to the normal mean values. No precipitation fell during or immediately prior to the field survey, and other weather conditions were usual for the time of year: afternoon temperatures of approximately 80^0 F, calm to light wind form the north, and morning fog burning off to clear afternoon skies.

Table 1. Precipitation summary of spatially comparable WETS data and monthly totals from the nearest NOAA Climatological Station. Data is presented for the three months preceding the field survey. WETS data includes average monthly precipitation and 30% range (in parenthesis). All units are in inches.

PRECEDING MONTHS PRECIPITATION SUMMARY					
August		July		June	
2014	Normal	2014	Normal	2014	Normal
0	0 (0-0)	0	0 (0-0)	0.01	0 (0-0.08)

Source: NRCS 2014a (generated by ACIS-NOAA Regional Climate Centers), NOAA 2014

E. METHODS

Field work for the delineation occurred on the 25th and 26th of August, 2014. Tetra Tech biologists Jeff Barna and Sara Townsend conducted all aspects of the field survey, with technical support from David Munro, PWS, and mapping support from GIS scientists, James Carney and Matt Iman (see *Section I; Authors and Qualifications* for additional information).

This delineation was conducted via field investigations following the 1987 *Corps of Engineers Wetland Delineation Manual* (USACE manual) (USACE 1987), the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (regional supplement) (USACE 2008), *Regulatory Guidance Letter; Ordinary High Water Mark Identification* (USACE 2005b), and the *Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (OHWM guidance) (USACE 2010). The California Rapid Assessment Method (CRAM) for Riverine Wetlands (CWMW 2013) was used to assess the functions of wetlands identified in the survey area.

Because an initial investigation indicated past and ongoing human alterations have occurred throughout the survey area to soils, vegetation, and hydrology (i.e., straightening and channelizing the streambed, and maintenance of vegetation and adjacent access roads), the methods for problematic conditions in the regional supplement (USACE 2008) were referenced during field work and the preparation of this delineation report.

National Wetland Inventory (NWI) data were reviewed to determine if wetlands or other waters had been previously identified within the site (USFWS 2014) (Appendix A, Figure 3). Other waters were also assessed by obtaining current National Hydrologic Data (NHD) maps for the survey area (USGS 2014) (Appendix A, Figure 4). Soil surveys for Santa Clara County, California (NRCS 1903, 2014b) were reviewed to determine mapped soil characteristics, and hydric soils were assessed using the current National List of Hydric Soils (NRCS 2014c) (Appendix A, Figure 2). Soil data analyses and NWI mapping data are discussed in their respective sections, above, and are discussed relative to field findings, below.

The routine methodology described in the USACE manual (USACE 1987) and regional supplement (USACE 2008) was the primary method employed for the field investigation, although the OHWM guidance was also extensively referenced (USACE 2010). Supporting resources included the following publications; *Munsell® Soil Color Charts* (2009 Edition) (Munsell 2009), *Jepson Manual: Vascular Plants of California, Second Edition* (Baldwin et al. 2012), *Weeds of the West: 5th Edition* (Parker et al. 2006), and *Aquatic and Riparian Weeds of the West* (DiTomaso and Healy 2003). Wetland plant indicator status was obtained from the U.S. Army Corps of Engineers *National Wetland Plant List* (Lichvar et al. 2014).

Before the initiation of data collection, a representative portion of the survey area was walked to plan how the Wetlands/Waters of the U.S./Waters of the State delineation would proceed. During the formal delineation, likely upland and wetland plots were selected and sampled to characterize community distinctions and to facilitate wetland boundary determinations. Sample plots were located within line-of-sight of one another at locations with clear breaks of topography, vegetation, and/or hydrologic features. At each sample plot, indicators of vegetation, hydrology, and soils were documented. Because topographic breaks were discrete and narrow, causing vegetation communities to change abruptly, vegetation strata were surveyed using relatively small diameter circular plots; 3 meter diameter plots for tree, shrub/sapling, and woody vine stratum, and 2 meter diameter plots for herbaceous strata.

According to USACE (2005b) (33 CFR Sections 328.3[e] and 329.11[a][1]), an ordinary high water mark (OHWM) is a; "…line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas." The USACE determines, on a case-by-case basis, the extent of geographic jurisdiction for the purpose of administering its regulatory program. For purposes of Section 404 of the Clean Water Act (CWA), the lateral limits of jurisdiction over non-tidal water bodies extend to the OHWM in the absence of adjacent wetlands. When adjacent wetlands are present, CWA jurisdiction extends beyond the OHWM to the limits of the adjacent wetlands. For purposes of Sections 9 and 10 of the Rivers and Harbors Act of 1899, the lateral extent of Federal jurisdiction, which is limited to the traditional navigable waters of the U.S., extends to the OHWM whether or not adjacent wetlands extend landward of the OHWM. Any features of Other Waters of the U.S. were documented in the field in intervals that were within line-of-site of adjacent survey points. The methods and field datasheet provided in the OHWM guidance (USACE 2010) were used to establish OHWM and any physical changes in stream structure and their locations along the survey area.

The method described above was also generally used to identify Waters of the State and those components of the stream that fall under the jurisdiction of the CDFW. Although riparian areas supported by moisture in the stream would also normally be included in CDFW jurisdictional areas, no such areas were identified. CDFW jurisdiction also includes areas from bank to bank; however, in this instance, since Berryessa Creek is a constructed trapezoidal channel and is extremely incised, the top of bank was identified as the internal top of bank; that is, the stream typically has an internal bank that ends at the edge of a steepened dirt wall, which extends vertically above the internal top of bank by up to 6 feet; therefore the Waters of the U.S. and Waters of the State were determined to be the same.

Mapping Methods

Field data was collected with a Trimble GeoExplorer 6000 Series GeoXH hand-held GPS, which collects data to sub-meter accuracy. Data was post-processed and transferred to GIS shapefiles, which were then overlain onto topographic base maps. Figures created with this data appear in Appendix A (Figures 5-9).

F. FINDINGS AND RESULTS

One wetland as well as Other Waters of the U.S./State were delineated in the survey area. The locations of these potentially jurisdictional features are presented as maps in Appendix A. Spatial dimensions of these features are presented in Table 2, below. Some areas of Other Waters also hosted small patches of fringing wetland. These wetlands were not delineated separately from WoUS, however, due to their small size and patchy distribution, being located below OHWM, and only providing small ecological influence on the primarily riverine system. It is estimated that less than 0.5 acre of patchy fringe wetland is present within the area of Other Waters of the U.S./Waters of the State, and is present in Upper Berryessa Creek mostly north of Ames Avenue (around the upstream extent of surface water) and in the lower part of Piedmont Creek. The previous delineation (USACE 2005a) identified approximately 0.38 acres of wetland in the same area, with the balance being WoUS.

Table 2. Summary of Wetlands and Other Waters of the U.S./State delineated within the survey area.

RESULTS SUMMARY		
Location	**HGM Class [1] or Other Waters Description [2]**	**Area (acres)**
Other Waters of the U.S./Waters of the State		
Mainstem of Upper Berryessa Creek, upstream of Calaveras Blvd.	Intermittent and Perennial Stream	4.05
Los Coches Creek	Intermittent Stream	0.10
Piedmont Creek	Perennial Stream	0.03
Wetland		
50' downstream of Calaveras Blvd.	RIVERINE: Occasionally Flooded, Floodplain, herb-dominated	0.02
Grand Total		**4.20**

[1] NRCS 2008
[2] Cowardin 1979

Other Waters of the U.S./Waters of the State

Identifying the OHWM is a method for determining the lateral limits of Waters of the U.S. and is indicated by shelving, changes in sediment texture, and changes in vegetation as described above (USACE 2005b). The OHWM is; "established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas." Effective discharge events capable of moving the greatest proportion of sediment over time establish the OHWM. In the Arid West region, these ordinary high flows are low- to moderate-discharge events.

Despite being highly engineered and altered, as a tributary to navigable water (San Francisco Bay), the area of Upper Berryessa Creek at or below the OHWM has been delineated as Other Waters of the U.S./Waters of the State. The survey area contains a total of 4.18 acres of Other Waters of the U.S./Waters of the State and 0.02 acre of wetland. Several areas of Berryessa Creek have been concrete-lined including areas of reinforcement under bridges and two prominent sections of high-angle stream bends in Reach 4.

Two of the most common features found throughout the survey area were: 1) consistent indicators of OHWM (Appendix C, Photos 11 to 14) and, 2) patchy vegetation typically consisting of a narrow fringe of hydrophytic species growing between unvegetated areas in the low-flow channel and the steep upland slopes (Appendix C, Photo 4). Most patches of hydrophytic vegetation averaged less than three feet wide due to being within the extremely incised channel. Because wetland hydrology was lacking in most

areas, hydrophytic vegetation was patchy, and the sandy/gravelly soil texture did not indicate hydric conditions, the majority of the survey area was determined to not be wetland (i.e., it consistently failed the three-factor wetland test, as described by the regional supplement in *Section 5; Difficult Wetland Situations in the Arid West* [USACE 2010]). However, because indicators of OHWM were common and typically located higher in elevation than patches of hydrophytic vegetation, most areas were determined to be within the lateral limits of Other Waters of the U.S./Waters of the State (USACE 2005b, 2010), and to fall under the jurisdiction of CDFW.

The engineered and consistent channel profile, and lack of riparian vegetation present throughout the survey area, combined with presence of vertical banks in many locations, results in the Other Waters of the U.S./Waters of the State having consistent dimensions. Universal indicators of OHWM included the following (taken from the OHWM guidance) and are presented in ranked order of frequency of occurrence (field datasheets are provided in Appendix B):

1. Change in vegetation species,
2. Break in bank slope,
3. Change in vegetation cover, and
4. Change in average sediment texture (present in most areas) (Appendix C, Photo 15).

Indicators of floodplains, present throughout the survey area, included the following, which are presented in ranked order of frequency of occurrence:

1. Drift and/or debris,
2. Presence of bed and bank,
3. Benches,
4. Surface relief, and
5. Soil development (not observed in all areas).

Overall, the presence of drift deposits was the most obvious and consistent indicator of OHWM in the survey area, and was used as one of the primary indicators to delineate the boundary, although other indicators were also present.

Upper Berryessa Creek is mapped as an intermittent water by USGS NHD (USGS 2014) (Appendix A, Figure 3), however, some evidence suggests that it is perennial downstream of Piedmont Creek in Reaches 1 and 2. Flowing water was found in and downstream of Piedmont Creek (water source) during the dry season, when it would normally not be expected (Appendix C, Photo 16). The flows, however, appear to be from urban runoff of unknown duration and frequency. Historic aerial photography suggests flow downstream of Piedmont Creek is inconsistent during the dry season, but has generally been absent. Under natural conditions, both Upper Berryessa Creek (in its entirety) and Piedmont Creek were likely intermittent streams, with flowing water only in the wet season. Upstream of Piedmont Creek in Reaches 3 and 4 (Appendix C), Upper Berryessa Creek was dry and displayed evidence of flashy flows, indicating it to be an intermittent stream. The USACE definition of a *perennial stream* is a stream that has flowing water year-round during a typical year, the water table is located above the stream bed for most of the year, and groundwater is the primary source of water for stream flow (2012). Because water does not flow year-round except where flow is provided by Piedmont Creek, the water table is located below the stream bed for most of the year (as evident from wetland test pits discussed below), and urban discharges are likely the primary source of water, it is determined that Berryessa Creek, is in fact an intermittent stream.

Wetland 1

The single wetland identified in the survey area is described below, and is shown on the overview map (Appendix A, Figure 5) as well as on the individual map for Reach 1 (Appendix A, Figure 6). Additional details of the wetland, including size and HGM classification, are presented in Table 2. Because no wetlands were identified by NWI in the survey area, locating and delineating wetlands during the survey was not anticipated.

Wetland 1 is located along the far northern end of the survey area in Reach 1, north of Calaveras Boulevard. In this area, the stream channel is relatively wide and slopes are shallow compared to upstream reaches, allowing the streambed to be relatively complex. The landform of Wetland 1 includes an island in the center of the stream channel, as well as the edge of the active channel (Appendix C, Photo 17). Wetland 1 is well-established relative to other areas within Berryessa Creek system, but is likely to have only been present for a less than 10 years, based on stream maintenance schedules and historic aerials. All vegetation is herbaceous, hydrophytic, and weedy. Hydrology is present in the form of surface flow, saturated soil, and water table (all being located below OHWM), and soils are mineral-based, recently deposited, and have no redoximorphic characteristics. The entire wetland is located below OHWM and within the delineated polygon for Other Waters of the U.S./State, but its relatively significant contribution to its surrounding ecology warranted its delineation. Wetland 1 is considered a *RIVERINE: Occasionally Flooded, Floodplain, herb-dominated wetland* (NRCS 2008). The majority of wetland plants identified in Wetland 1 are those listed for fringing wetland in Table 3, below.

Vegetation

Vegetation patterns associated with Other Waters of the U.S./State and Wetland 1 were distinct and corresponded to topographic breaks. Despite the highly managed vegetation in the survey area, most areas located below the OHWM had not been mowed at the time of the survey, but at least some portions had been sprayed with herbicide. Although soil type varied by elevation, as evident in the cut banks found throughout the incised survey area (Appendix C, Photo 18), elevation of hydrology is likely the most influential factor in determining the distribution of plant species. For example, there were clear differences in vegetation composition above and below Piedmont Creek at comparable elevations and soil types (see NRCS 2014b).

Vegetation patterns described in *Section C; Existing Conditions* were identified during the survey. Summary data corresponding to these patterns is presented in Table 3, below, and includes vegetation type, species, average cover, general distribution, wetland indicator status, and location relative to hydrology.

Table 3. Summary of vegetation conditions in the survey area.

VEGETATION CONDITIONS						
Vegetation Type	**Scientific Name**	**Common Name**	**Average Cover (%)**	**Distribution**	**Indicator Status [1]**	**Location Relative to Hydrology**
Herb-dominated Upland	*Avena fatua*	Wild Oat	70	Throughout	UPL	Above
	Bromus diandrus	Ripgut brome	70	Throughout	NL	Above
	Amaranthus albus	Tumbleweed	30	Patchy	FACU	Above
	Brassica nigra	Black mustard	25	Throughout	NL	Above

VEGETATION CONDITIONS						
Vegetation Type	**Scientific Name**	**Common Name**	**Average Cover (%)**	**Distribution**	**Indicator Status [1]**	**Location Relative to Hydrology**
	Lactuca serriola	Prickly Wild Lettuce	25	Throughout	FACU	Above
	Bromus catharticus	Rescue grass	25	Throughout	NL	Above
	Lolium multiflorum	Italian rye grass	10	Throughout	FAC	Above
	Malva parviflora	Cheeseweed mallow	5	Throughout	NL	Above
	Malva nicaeensis	Bull mallow	5	Throughout	NL	Above
	Conyza canadensis	Horseweed	5	Patchy	NL	Above
	Leymus cinereus	Giant wild rye	5	Patchy	FAC	Above
	Sonchus asper	Prickly sow thistle	5	Throughout	FAC	Above
	Tragopogon porrifolius	Purple salsify	5	Patchy	NL	Above
	Convolvulus arvense	Field bindweed	5	Patchy	NL	Above
Fringing wetland	*Cyperus eragrostis*	Tall flatsedge	70	Throughout	FACW	Above
	Echinochloa sp.	Barnyard grass	30	Throughout	FACW	Above
	Veronica americana	American brooklime	30	Throughout	OBL	Above
	Polygonum persicaria	Spotted lady's thumb	20	Throughout	FACW	Above
	Veronica anagallis-aquatica	Water speedwell	20	Throughout	OBL	Above
	Typha latifolia	Common cattail	10	Patchy	OBL	Above
	Xanthium strumarium	Rough cockleburr	10	Throughout	FAC	Above
	Lythrum hyssopifolia	Hyssop loosestrife	10	Patchy	NL	Above
	Foeniculum vulgare	Sweet fennel	5	Patchy	NL	Above
	Polypogon monspeliensis	Rabbit's foot grass	5	Throughout	FACW	Above
	Polygonum lapathifolium	Willow smartweed	5	Throughout	FACW	Above
	Juncus xiphioides	Iris leaf rush	5	Patchy	OBL	Above
	Salix laevigata	Red willow	5	Patchy	FACW	Above
Aquatic	*Ludwigia peploides*	Floating water primrose	20	High density patches	FACW	At/Below
	Rorippa nasturtium-aquaticum	Watercress	15	Throughout	OBL	At/Below

VEGETATION CONDITIONS						
Vegetation Type	**Scientific Name**	**Common Name**	**Average Cover (%)**	**Distribution**	**Indicator Status** [1]	**Location Relative to Hydrology**
	Bacopa eisenii	Gila River water hyssop	10	Throughout	OBL	At/Below
Wetland/Upland Transition	*Equisetum telmateia*	Giant horsetail	40	Throughout	FACW	At
	Paspalum distichum	Knot grass	40	Throughout	FACW	At
	Raphanus sativus	Wild radish	20	Throughout	NL	At
	Epilobium ciliatum	Fringed willowherb	20	Throughout	FACW	At
	Urtica dioica	Hoary nettle	10	Patchy	FAC	At
	Phalaris aquatica	Harding grass	10	Patchy	FACU	At
	Lepidium latifolium	Perennial pepperweed	10	Throughout	FAC	At
	Rumex conglomeratus	Green dock	10	Patchy	FACW	At
	Populus fremontii	Fremont cottonwood	10	Patchy	FAC	At
	Oenothera elata	Evening primrose	5	Patchy	FACW	At
	Ricinus communis	Castor bean	5	Patchy	FACU	At
	Conium maculatum	Poison hemlock	5	Patchy	FACW	At
	Rubus armeniacus	Himalayan blackberry	5	Patchy	FACU	At
	Schinus molle	Peruvian peppertree	5	Patchy	FACU	At
	Quercus agrifolia	Coast live oak	5	Patchy	NL	At
	Ulmus sp.	Elm (exotic)	5	Patchy	NL	At
Other Plants Adjacent to Survey Area	*Pinus radiata*	Monterey Pine	NA	Patchy	NL	Above
	Juglan hindsii	Black walnut	NA	Patchy	NL	Above
	Quercus ilex	Holly oak	NA	Patchy	NL	Above
	Salix babylonica	Weeping willow	NA	Patchy	FAC	Above
	Sambucus mexicana	Blue elderberry	NA	Patchy	FAC	Above

[1] Lichvar et al. 2014

Soils

Soils require long periods, in some cases hundreds of years, for development of wetland soil characteristics. Substantial alterations to Upper Berryessa Creek's natural channel, through its human-induced channelization and subsequent maintenance, have prevented natural wetland soils development. Because the likelihood of hydric soil characteristics being present within the constructed channel was expected to be low, standard soil profile test pits were only placed in areas with clear

characteristics of a relatively well-established wetland. Only one such place in Reach 1 was identified during the survey. No hydric soil characteristics were observed during the survey, including in areas delineated as wetland.

Two test pits were sampled at Wetland 1 – one within the wetland (W1) and the other in the adjacent upland (U1) (datasheets are presented in Appendix B). The soils in both test pits appeared to be recently deposited and likely composed of recent alluvium. Soil color in test pit W1 was 10YR2/1 in the first 6 inches, and 10YR2/2 between 6 and 20 inches. Texture was sandy in the surface, and a combination of sand, gravel, and cobble was found below. No redoximorphic features were observed. Although the likely young age of the soils was not expected to convey hydric features, the dark matrix color may mask the expression of redoximorphic features that are present (see: *Section 5; Difficult Wetland Situations in the Arid West* [USACE 2010]). Soil color of the paired upland plot (U1) was 10YR5/2 from the surface to a depth of 20 inches, and had a sandy texture. No redoximorphic features were present. It is assumed that Wetland 1 had only been present for a relatively short period due to frequent channel maintenance and the dynamic nature of the system.

In the remainder of the survey area, soils appeared to be a mix of sand, cobble, rock, and human-made hard surfaces. Several areas of Upper Berryessa Creek have been concrete-lined, including areas of reinforcement under bridges and two prominent sections of high-angle bends in the stream located upstream of Montague Expressway (Appendix A, Sheet 4). All areas appeared engineered and recently disturbed by maintenance activities and/or high velocity flows resulting from the channelized nature of the streambed.

Hydrology

The confluence with Piedmont Creek, a relatively large tributary of Upper Berryessa Creek, defines the transition between Reach 2 and Reach 3. Piedmont Creek also provided the only flowing surface water into the system. Piedmont Creek has three to four forks beginning at private ranch properties located upslope in the eastern foothills in Milpitas. At Piedmont Road, the two primary forks join and flow into a piped underground stream that passes under residences and daylights 0.8 miles upstream of the confluence. Like Berryessa Creek, the open channel of Piedmont Creek is embedded within a highly altered residential and industrial zone. Piedmont Creek is designated as an intermittent water by USGS NHD (USGS 2014). Because the field survey occurred in late summer and Upper Berryessa Creek was mostly dry above Reach 2, it is presumed hydrology observed in Piedmont Creek was from urban sources. It is unclear what the flow duration is for Piedmont Creek, or when it began to contribute to Upper Berryessa Creek during the dry season. No other tributary of Upper Berryessa Creek within the survey area had surface flows, or evidence of recent flows at the time of the field survey.

Some low depressions in Upper Berryessa Creek, likely caused by scouring during periods of high flows, had ponded water at the time of the survey. Ponding in these scour holes was likely due to the depressions being recessed below the water table, allowing water to surface. Most ponded scour holes were shallow, relatively small, hosted abundant algae growth, and were located between Piedmont Creek and Ames Avenue.

G. CONCLUSIONS

According to the USACE manual and implementing guidance, there must be positive indicators of each parameter (hydrophytic vegetation, hydrology, and hydric soils) present to make a wetland

determination. Additionally, the CDFW takes jurisdiction over riparian areas that may not otherwise qualify as wetlands, but also includes; "…lands which contain habitat which grows close to and which depends on soil moisture from a nearby freshwater source" (CA Fish and Wildlife Code 2785(e)). However, because most areas lacked at least two of three indicators, but instead exhibited clear indicators of OHWM, the majority of Upper Berryessa Creek was delineated as Other Waters of the U.S./State, and one wetland within OHWM was delineated. Functionally, the survey area exhibited distinct elements of a riverine system, and the fringing wetland present was small, patchy, and located within the boundaries of the OHWM. Evidence suggests the system is highly dynamic due to the flashy flows it receives during the wet season, and because of maintenance activities, which combine to alter vegetation and soils (when maintenance requires erosion control or other earthwork) on a regular basis. The engineered structure of the channel further prevents the development of wetland features, due to the system being designed to efficiently move storm flows. The distinct wetland identified in the survey area below Calaveras Blvd. was located in an area where the stream channel is wider and banks maintain a relatively more gradual angle, allowing the low-flow channel to be somewhat meandering. Wetland hydrology and hydrophytic vegetation were present in the wetland area, and the landscape position is such that hydric soil conditions would form under normal conditions. Fringing wetlands identified upstream of Calaveras Boulevard were not considered as being distinct from WoUS in that area due to their location below the OHWM, lack of distinct functional characteristics, and lack of characteristics that would lead to formation of hydric soils.

In general, all natural aspects of Upper Berryessa Creek in the survey area have been disturbed and altered by human activities. There was no evidence of habitat that would support protected aquatic or terrestrial species in the survey area.

Because a wetland was determined to be present in the survey area, a CRAM assessment was completed for this feature and is included in Appendix B. A summary of CRAM assessment scores are presented in Table 4, below. Overall, the wetland was of poor quality and degraded by the altered system and maintenance that occurs in the survey area.

Table 4. CRAM attributes and scores for the wetland identified in the survey area.

Attribute	Score
Attribute 1: Buffer and Landscape Context	25
Attribute 2: Hydrology	58
Attribute 3: Physical Structure	50
Attribute 4: Biotic Structure	36
Overall AA Score	**42**

H. DISCLAIMER

This report documents the investigation, best professional judgment, and conclusions of the investigators. It should be considered a Preliminary Jurisdictional Determination and used at your own risk until it has been approved in writing by the reviewing agency/agencies.

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APPENDIX A: FIGURES

Figure 1: Project Location and Reaches

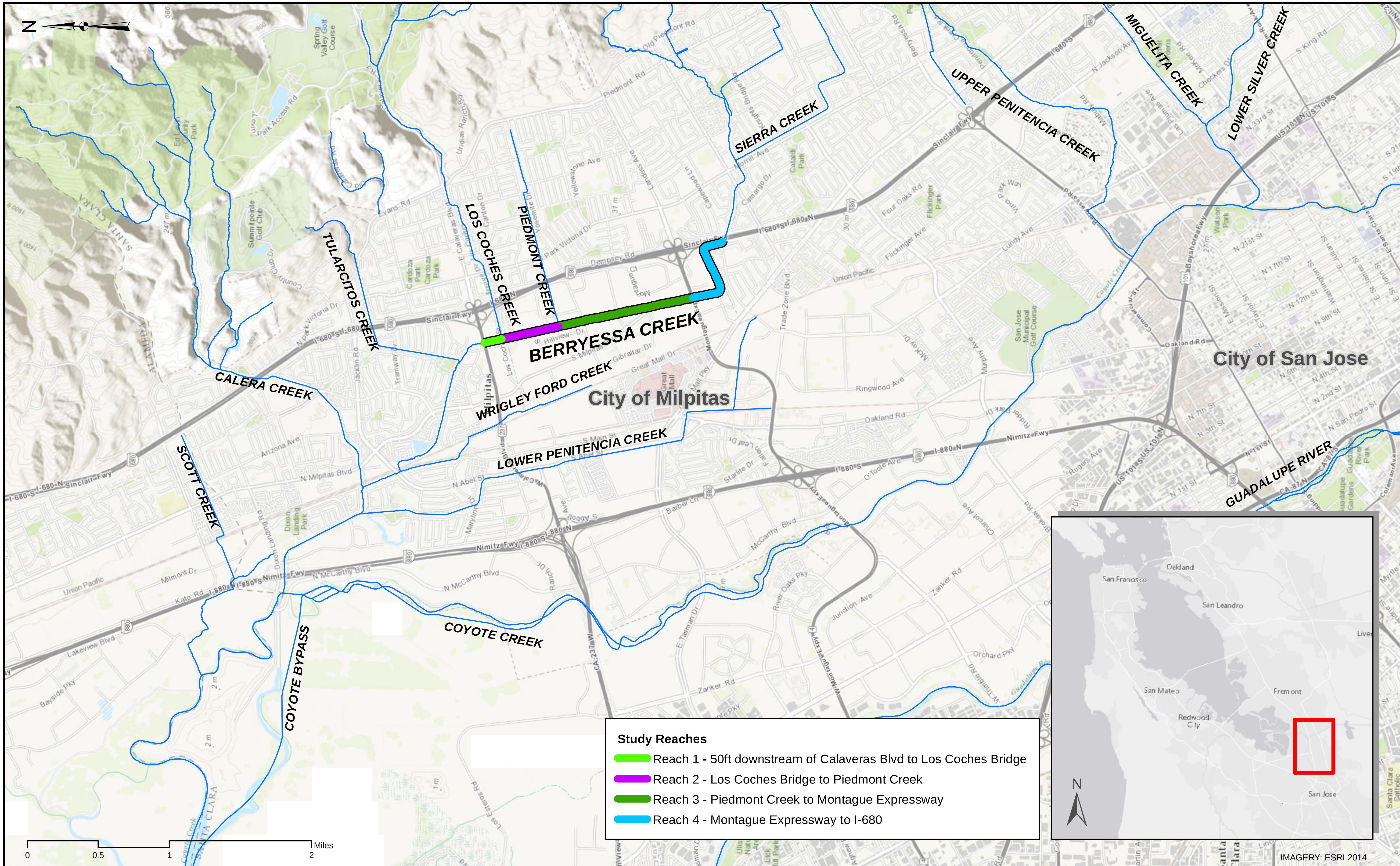
Figure 2: NRCS Soil Surveys and Hydric Ratings

Figure 3: NWI Map

Figure 4: NHD Map

Figures 5-10: Wetlands/Waters of the U.S./Waters of the State, by Reach

Figure 1: Project Location and Reaches



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Santa Clara Valley Water District

County of Santa Clara, California

UPPER BERRYESSA CREEK
FLOOD RISK MANAGEMENT PROJECT

Wetlands/Waters of the U.S./Waters of the State

Figure 2: NRCS Soil Surveys and Hydric Ratings

United States Department of Agriculture

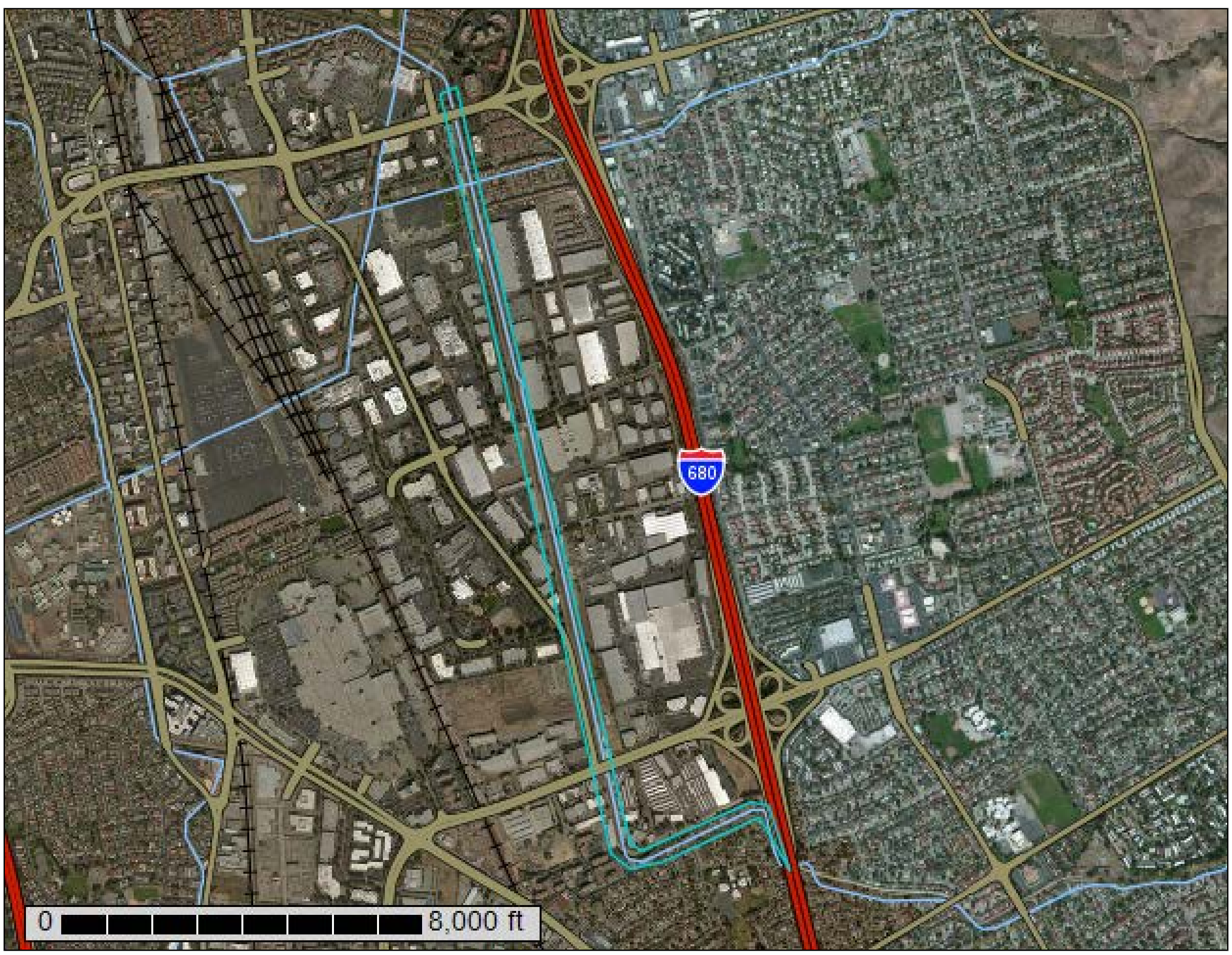
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Santa Clara Area, California, Western Part



November 19, 2014

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

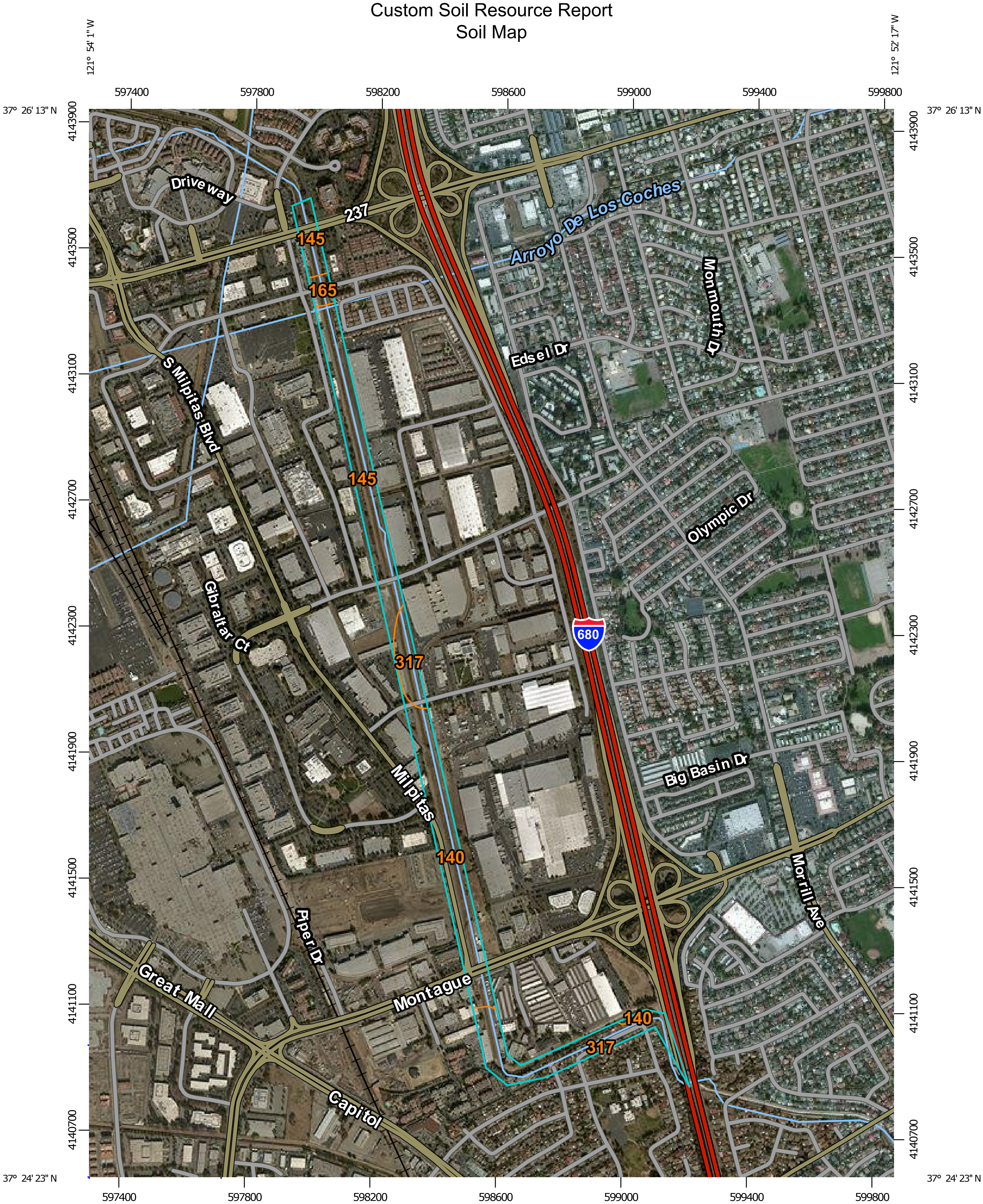
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map



Map Scale: 1:16,500 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0, 200, 400, 800, 1200

Feet: 0, 500, 1000, 2000, 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Santa Clara Area, California, Western Part
Survey Area Data: Version 3, Sep 18, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 12, 2010—Nov 3, 2013

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Santa Clara Area, California, Western Part (CA641)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
140	Urban land-Flaskan complex, 0 to 2 percent slopes	18.4	31.3%
145	Urbanland-Hangerone complex, 0 to 2 percent slopes, drained	21.2	36.1%
165	Urbanland-Campbell complex, 0 to 2 percent slopes, protected	1.5	2.6%
317	Urbanland-Cropley complex, 0 to 2 percent slopes	17.5	29.9%
Totals for Area of Interest		**58.7**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic

classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Santa Clara Area, California, Western Part

140—Urban land-Flaskan complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 1nszx
Elevation: 20 to 660 feet
Mean annual precipitation: 14 to 24 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 275 to 325 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 70 percent
Flaskan and similar soils: 20 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform: Alluvial fans
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Disturbed and human transported material

Description of Flaskan

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from metamorphic and sedimentary rock and/or alluvium derived from metavolcanics

Typical profile

Ap - 0 to 2 inches: sandy loam
ABt - 2 to 7 inches: sandy clay loam
Bt1 - 7 to 17 inches: gravelly sandy clay loam
Bt2 - 17 to 31 inches: gravelly sandy clay loam
C - 31 to 59 inches: very gravelly sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Salinity, maximum in profile: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: C

Minor Components

Pachic haploxerolls, loamy-skeletal

Percent of map unit: 5 percent
Landform: Alluvial fans
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear

Landelspark

Percent of map unit: 2 percent
Landform: Alluvial fans
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear

Botella

Percent of map unit: 2 percent
Landform: Alluvial fans
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear

Stevenscreek

Percent of map unit: 1 percent
Landform: Alluvial fans
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear

145—Urbanland-Hangerone complex, 0 to 2 percent slopes, drained

Map Unit Setting

National map unit symbol: 1nszw
Elevation: 0 to 220 feet
Mean annual precipitation: 14 to 24 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 275 to 325 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 70 percent
Hangerone, drained, and similar soils: 25 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform: Basin floors
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Disturbed and human-transported material

Description of Hangerone, Drained

Setting

Landform: Basin floors
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear, convex
Parent material: Alluvium derived from metamorphic and sedimentary rock and/or alluvium derived from metavolcanics

Typical profile

A1 - 0 to 9 inches: clay
A2 - 9 to 17 inches: clay
Bw - 17 to 27 inches: clay
Bk - 27 to 35 inches: clay
Ck - 35 to 45 inches: clay loam
C - 45 to 72 inches: gravelly loam
2Ab - 72 to 89 inches: clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 25 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.2 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 5.0
Available water storage in profile: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: C

Minor Components

Bayshore

Percent of map unit: 2 percent
Landform: Basin floors
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear

Clear lake

Percent of map unit: 2 percent
Landform: Basin floors
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear

Embarcadero

Percent of map unit: 1 percent
Landform: Basin floors
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear

165—Urbanland-Campbell complex, 0 to 2 percent slopes, protected

Map Unit Setting

National map unit symbol: 1qsvl
Elevation: 0 to 240 feet
Mean annual precipitation: 14 to 24 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 275 to 325 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 70 percent
Campbell, protected, and similar soils: 20 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform: Alluvial fans
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Disturbed and human-transported material

Description of Campbell, Protected

Setting

Landform: Alluvial fans
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from metamorphic and sedimentary rock and/or alluvium derived from metavolcanics

Typical profile

Ap - 0 to 10 inches: silt loam
A1 - 10 to 24 inches: silt loam
A2 - 24 to 31 inches: silty clay loam
A3 - 31 to 38 inches: silty clay loam
2A - 38 to 51 inches: silty clay loam
2Bw1 - 51 to 71 inches: silty clay
2Bw2 - 71 to 79 inches: silty clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (1.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 5.0
Available water storage in profile: High (about 10.4 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: C

Minor Components

Newpark

Percent of map unit: 5 percent
Landform: Alluvial fans
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear

Clear lake

Percent of map unit: 5 percent
Landform: Basin floors
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear

317—Urbanland-Cropley complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 261rq
Elevation: 10 to 530 feet
Mean annual precipitation: 14 to 24 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 275 to 325 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 75 percent
Cropley and similar soils: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Disturbed and human-transported material

Description of Cropley

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from calcareous shale

Typical profile

A1 - 0 to 4 inches: clay
A2 - 4 to 11 inches: clay
Bss1 - 11 to 24 inches: clay
Bss2 - 24 to 33 inches: clay
Bss3 - 33 to 51 inches: clay
BCk1 - 51 to 57 inches: sandy clay loam
BCk2 - 57 to 63 inches: sandy clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (1.0 to 3.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 5.0
Available water storage in profile: High (about 9.1 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: C

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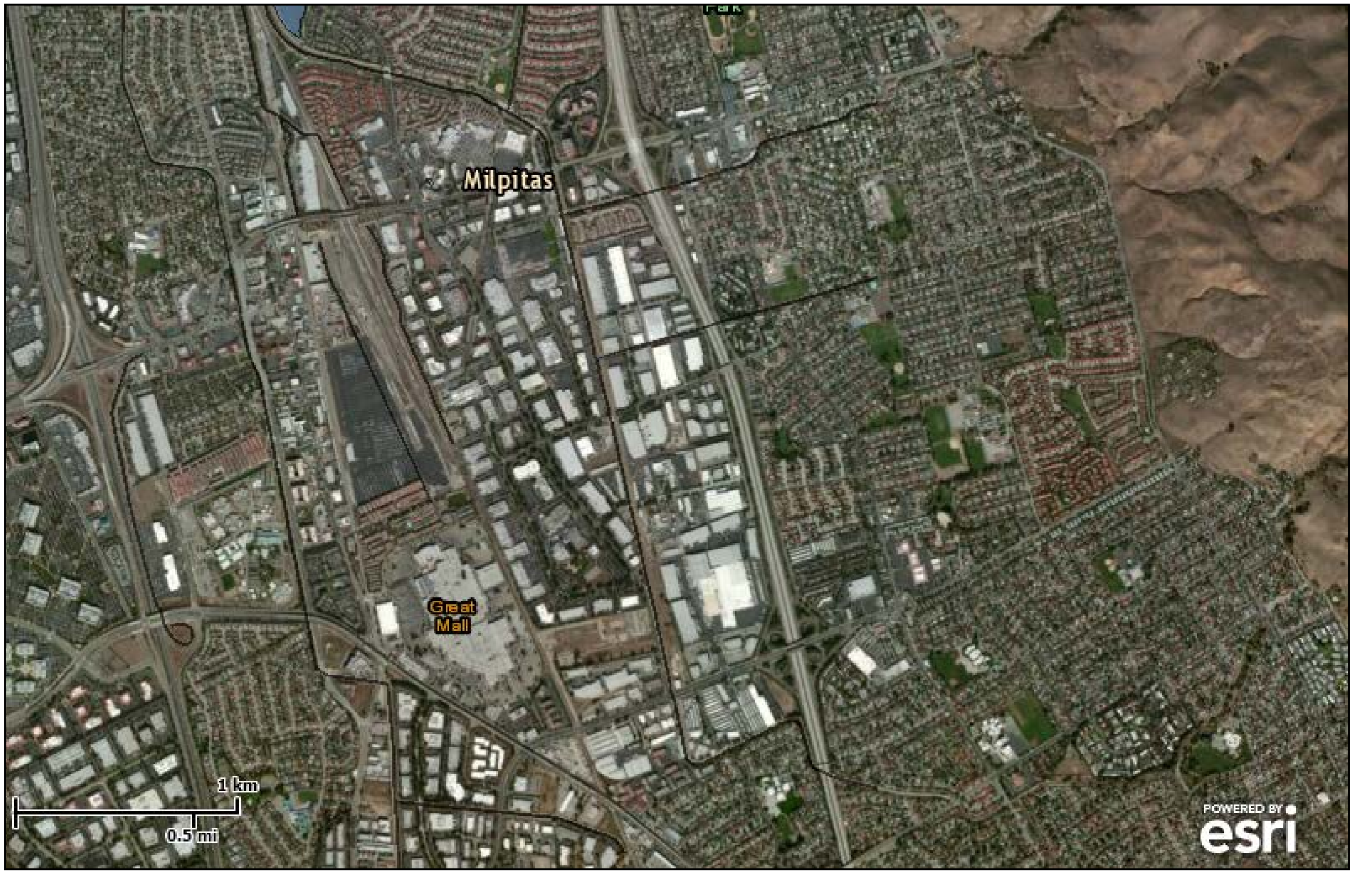
Figure 3: NWI Map

U.S. Fish and Wildlife Service

National Wetlands Inventory

Berryessa Crk

Sep 19, 2014



Wetlands

- Freshwater Emergent
- Freshwater Forested/Shrub
- Estuarine and Marine Deepwater
- Estuarine and Marine
- Freshwater Pond
- Lake
- Riverine
- Other

Riparian

- Herbaceous
- Forested/Shrub

Riparian Status

- Digital Data

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

User Remarks:

Figure 4: NHD Map

The National Map

NOTES: Data available from U.S. Geological Survey, National Geospatial Program.

Open in The National Map Viewer

9/3/14 11:44 AM

Figures 5-10: Wetlands/Waters of the U.S./Waters of the State, by Reach

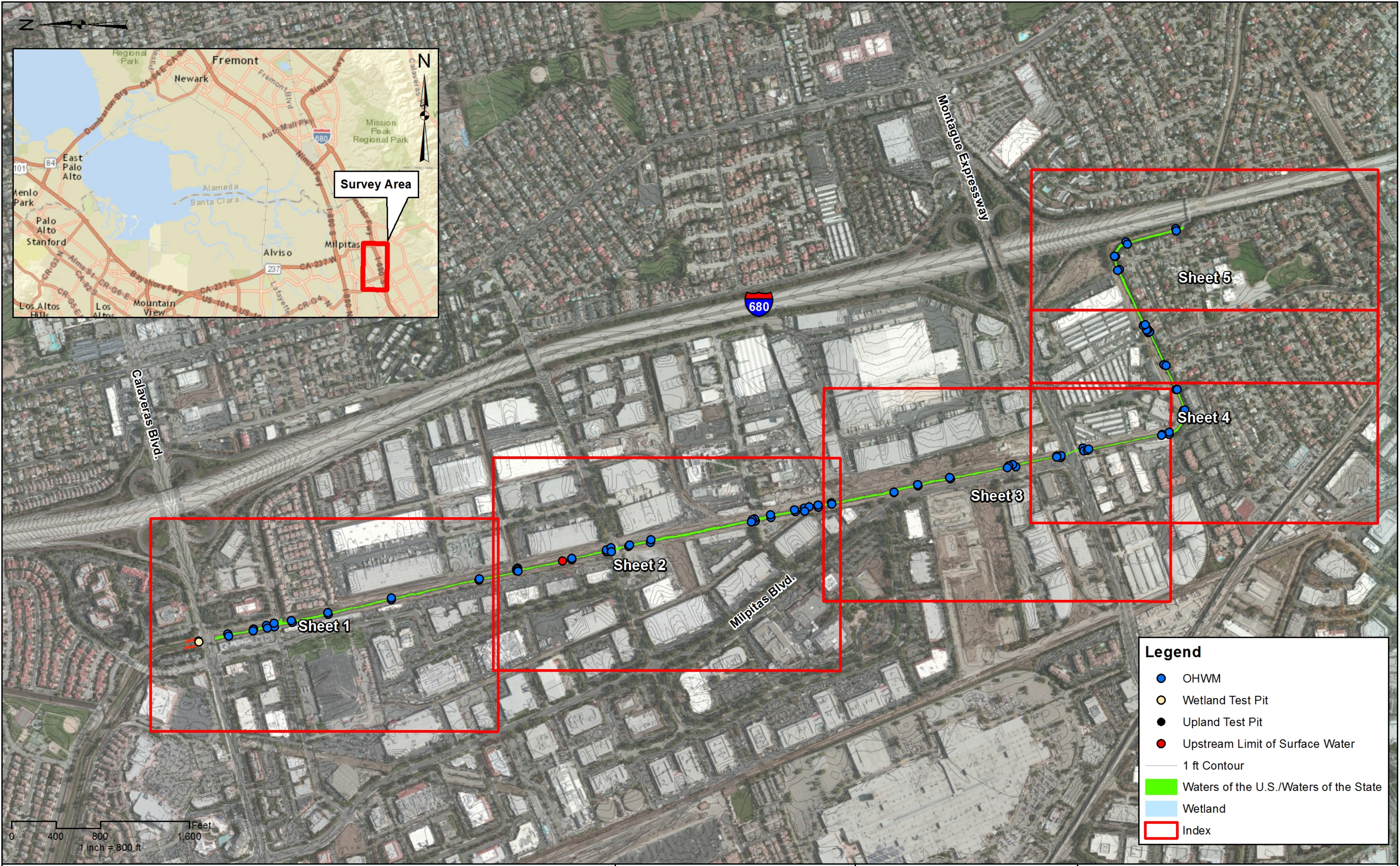


Figure 5: Survey Area
Orthophotography: ESRI World Imagery, 11/02/2010.
Prepared by: Matthew Iman. Date: 09/26/2014.

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Santa Clara Valley Water District

County of Santa Clara, California

UPPER BERRYESSA CREEK FLOOD RISK MANAGEMENT PROJECT: WETLANDS, WATERS OF THE U.S., AND WATERS OF THE STATE

Figure 6: Calaveras Blvd. to 1000' Downstream of Yosemite Drive
Orthophotography: ESRI World Imagery, 11/02/2010.
Prepared by: Matthew Iman. Date: 09/26/2014. Revised 04/01/2015

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UPPER BERRYESSA CREEK FLOOD RISK MANAGEMENT PROJECT: WETLANDS, WATERS OF THE U.S., AND WATERS OF THE STATE

Figure 7: 1100' Downstream of Yosemite Drive to 250' Downstream of Gibralter Drive
Orthophotography: ESRI World Imagery, 11/02/2010.
Prepared by: Matthew Iman. Date: 09/26/2014. Revised 04/01/2015

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Santa Clara Valley Water District

County of Santa Clara, California

UPPER BERRYESSA CREEK FLOOD RISK MANAGEMENT PROJECT: WETLANDS, WATERS OF THE U.S., AND WATERS OF THE STATE

Figure 8: 375' Downstream of Gibralter Drive to 870' Upstream of Montague Expwy.
Orthophotography: ESRI World Imagery, 11/02/2010.
Prepared by: Matthew Iman. Date: 09/26/2014.

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Santa Clara Valley Water District

County of Santa Clara, California

UPPER BERRYESSA CREEK FLOOD RISK MANAGEMENT PROJECT: WETLANDS, WATERS OF THE U.S., AND WATERS OF THE STATE

Figure 9: 315' Downstream of Montague Expwy. to 315' Upstream of Lakewood Drive.
Orthophotography: ESRI World Imagery, 11/02/2010.
Prepared by: Matthew Iman. Date: 09/26/2014.

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Santa Clara Valley Water District

County of Santa Clara, California

UPPER BERRYESSA CREEK FLOOD RISK MANAGEMENT PROJECT: WETLANDS, WATERS OF THE U.S., AND WATERS OF THE STATE

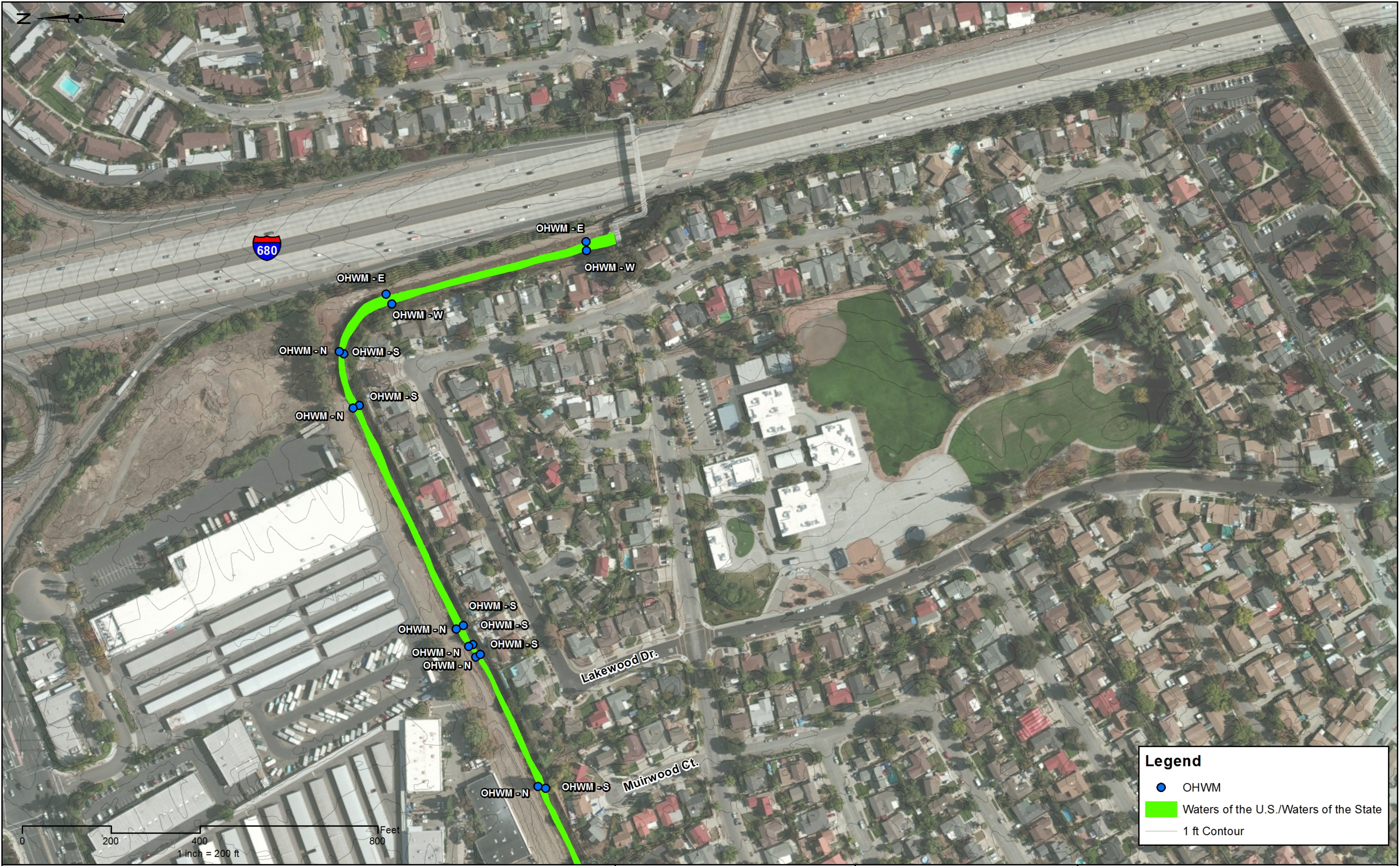

Figure 10: Interstate 680 to100' Downstream of Muirwood Ct.
Orthophotography: ESRI World Imagery, 11/02/2010.
Prepared by: Matthew Iman. Date: 09/26/2014.

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Santa Clara Valley Water District

County of Santa Clara, California

UPPER BERRYESSA CREEK FLOOD RISK MANAGEMENT PROJECT: WETLANDS, WATERS OF THE U.S., AND WATERS OF THE STATE

APPENDIX B: DATA FORMS

and

WETLAND RATING FORMS

Wetland 1 Data Forms

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Berryessa Crk City/County: Milpitas Sampling Date: 25 Aug '14

Applicant/Owner: SCV water DIST. State: CA Sampling Point: W1

Investigator(s): J. Barnes Section, Township, Range: Mt. Diablo T6S, R1E, Sec 9

Landform (hillslope, terrace, etc.): Stream bed Local relief (concave, convex, none): convex Slope (%): 1

Subregion (LRR): ______ Lat: 37.433950° Long: -121.892825° Datum: NAD 84

Soil Map Unit Name: Urban land-Hangerone complex, 0-2% slopes, drained. NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___
Hydric Soil Present?	Yes ___	No X
Wetland Hydrology Present?	Yes X	No ___

Is the Sampled Area within a Wetland? Yes X No ___

Remarks: Entire System has been engineered - Channelized & maintained, Area in Reach 1A has widest profile

New Soils = Not enough Time to develope Hydric Characteristics.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 2)			
1. Polygonum sp. (Lady thumb)	80	X	FACW
2. Typha	25		OBL
3. Echinocloa sp.	30	X	FACW
4. Cyperus eragrostis	15		FACW
5. Foeniculum sp.	3		NL
6.			
7.			
8.			
= Total Cover	153		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum Ø % Cover of Biotic Crust Ø

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ___	x 1 = ___
FACW species ___	x 2 = ___
FAC species ___	x 3 = ___
FACU species ___	x 4 = ___
UPL species ___	x 5 = ___
Column Totals: ___ (A)	___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

- X Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

SOIL

Sampling Point: W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 2/1	100					Fine Sand	
7-20	10YR 2/2	100					Sand, Gravel, Cobble	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ___ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- X Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 10"

Water Table Present? Yes X No ___ Depth (inches): Surf

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): Surf

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Hydrology From urban Sources.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Berryessa Crk City/County: Milpitas Sampling Date: 25 Aug '14

Applicant/Owner: SCV water DIST. State: CA Sampling Point: U1

Investigator(s): J. Barna Section, Township, Range: Mt. Diablo T6S, R1E, Sec 9

Landform (hillslope, terrace, etc.): Stream bed Local relief (concave, convex, none): Convex Slope (%): 1

Subregion (LRR): ______ Lat: 37.433950° Long: -121.892825° Datum: NAD 84

Soil Map Unit Name: Urbanland-Hangerone complex, 0-2% Slopes, drained NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X
Hydric Soil Present?	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X

Is the Sampled Area within a Wetland? Yes ____ No X

Remarks: Entire System has been engineered - Channelized & maintained, Area in Reach 1A has widest profile

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 2)			
1. Brassica nigra	60	X	NL
2. Malva sp.	5		NL
3. Bromus catharticus	60	X	NL
4.			
5.			
6.			
7.			
8.			
= Total Cover	125		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum Ø % Cover of Biotic Crust Ø

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: Ø (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: Ø (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

SOIL

Sampling Point: 41

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 5/2	100					Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: __________

Depth (inches): __________

Hydric Soil Present? **Yes** ____ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): ______
Water Table Present? Yes ____ No X Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): ______

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Wetland Rating Forms

CRAM Assessment

Basic Information Sheet: Riverine Wetlands

Assessment Area Name: Berryessa (Reach 1A) - Below Calaveras Blvd	
Project Name: Berryessa Creek	
Assessment Area ID #: Reach 1A	
Project ID #:	**Date:** 25 Aug 2014 / 1135 hrs.
Assessment Team Members for This AA: JB / ST	
Average Bankfull Width: 30'	
Approximate Length of AA (10 times bankfull width, min 100 m, max 200 m): 40'	
X **Upstream Point Latitude:** 37.433905	**Longitude:** -121.892795
X **Downstream Point Latitude:** 37.433994	**Longitude:** -121.892861
Wetland Sub-type: ☐ Confined ☒ Non-confined	
AA Category: ☒ Restoration ☐ Mitigation ☒ Impacted ☐ Ambient ☐ Reference ☐ Training ☐ Other:	
Did the river/stream have flowing water at the time of the assessment? ☒ yes ☐ no	
What is the apparent hydrologic flow regime of the reach you are assessing? The hydrologic flow regime of a stream describes the frequency with which the channel conducts water. *Perennial* streams conduct water all year long, whereas *ephemeral* streams conduct water only during and immediately following precipitation events. *Intermittent* streams are dry for part of the year, but conduct water for periods longer than ephemeral streams, as a function of watershed size and water source. Artificial (Likely) - Flow from urban sources. No ~~☒~~ perennial ☒ intermittent ☐ ephemeral	

BFH = 3'

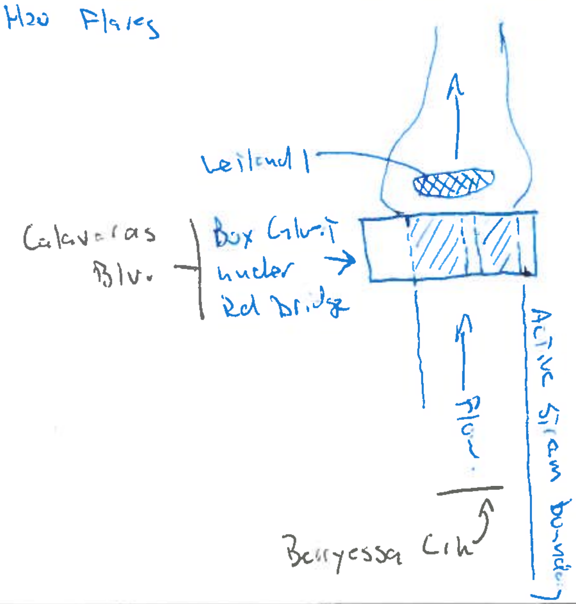
Possibly as well

Photo Identification Numbers and Description:

	Photo ID No.	Description	Latitude	Longitude	Datum
1		Upstream			
2		Middle Left			
3		Middle Right			
4		Downstream			
5					
6					
7					
8					
9					
10					

Site Location Description:

Site heavily altered / Disturbed - urban Creek Sys, Channelized with Concrete lining in places, Steep banks w/ erosional problems, wetland @ downstream Toe of box Culvert where Flowing H2O Flares



Comments:

Scoring Sheet: Riverine Wetlands

AA Name: Wetland 1 (Berryessa Creek, Reach 1A)			**Date:** 25 Aug 2014	
Attribute 1: Buffer and Landscape Context (pp. 11-19)			**Comments**	
	Alpha.	Numeric		
Stream Corridor Continuity (D)	D	3	Highly Altered & maintained	
Buffer:			• urban setting	
	Alpha.	Numeric	• very little similar to	
Buffer submetric A: Percent of AA with Buffer	D	3	Native-Type Condition	
Buffer submetric B: Average Buffer Width	D	3	• Novel env - Perennial flows • Flows from urban	
Buffer submetric C: Buffer Condition	D	3	Sources	
Raw Attribute Score = $D+[C \times (A \times B)^{1/2}]^{1/2}$		6	**Final Attribute Score = (Raw Score/24) x 100**	25
Attribute 2: Hydrology (pp. 20-26)				
	Alpha.	Numeric		
Water Source	D	3	unnatural Hydrology	
Channel Stability	C	6		
Hydrologic Connectivity	A	12		
Raw Attribute Score = sum of numeric scores		21	**Final Attribute Score = (Raw Score/36) x 100**	58
Attribute 3: Physical Structure (pp. 27-33)				
	Alpha.	Numeric		
Structural Patch Richness	C	6		
Topographic Complexity	C	6		
Raw Attribute Score = sum of numeric scores		12	**Final Attribute Score = (Raw Score/24) x 100**	50
Attribute 4: Biotic Structure (pp. 34-41)				
Plant Community Composition (based on sub-metrics A-C)				
	Alpha.	Numeric		
Plant Community submetric A: Number of plant layers	C	6		
Plant Community submetric B: Number of Co-dominant species	D	3		
Plant Community submetric C: Percent Invasion	A	12		
Plant Community Composition Metric *(numeric average of submetrics A-C)*		7		
Horizontal Interspersion	D	3		
Vertical Biotic Structure	D	3		
Raw Attribute Score = sum of numeric scores		13	**Final Attribute Score = (Raw Score/36) x 100**	36
Overall AA Score (average of four final Attribute Scores)			42	

Ordinary High Water Mark Identification Forms

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Berryessa (Reach 1A), below Calaveras Blvd	**Date:** 25 Aug '14 **Time:** 1135 hrs
Project Number:	**Town:** Milpitas **State:** CA
Stream: Berryessa Crk	**Photo begin file#:** **Photo end file#:**
Investigator(s): AB/ST	
Y [X] / N [ ] Do normal circumstances exist on the site?	**Location Details:** Berryessa (Reach 1A) Down stream of Calaveras Blvd.
Y [X] / N [ ] Is the site significantly disturbed?	**Projection:** **Datum:** **Coordinates:**

Potential anthropogenic influences on the channel system:

• Channelized, maintained, concreted, straitened, sprayed for weeds (Roundup), mowed in upland areas.

Brief site description:

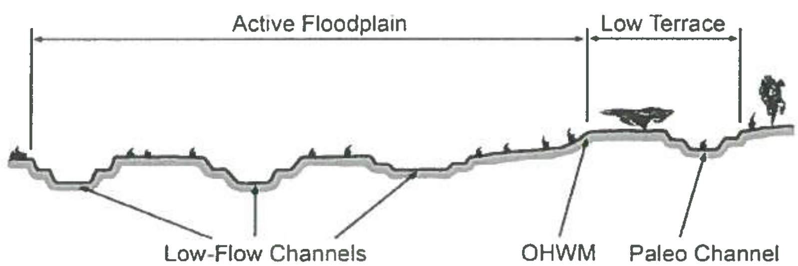
silt, weedy veg, heavily managed, perennial system, heavily urbanized throughout.

Checklist of resources (if available):

- [X] Aerial photography
  Dates:
- [X] Topographic maps
- [ ] Geologic maps
- [ ] Vegetation maps
- [X] Soils maps
- [ ] Rainfall/precipitation maps
- [X] Existing delineation(s) for site
- [ ] Global positioning system (GPS)
- [ ] Other studies

- [X] Stream gage data
  Gage number:
  Period of record:
  - [ ] History of recent effective discharges
  - [ ] Results of flood frequency analysis
  - [ ] Most recent shift-adjusted rating
  - [X] Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

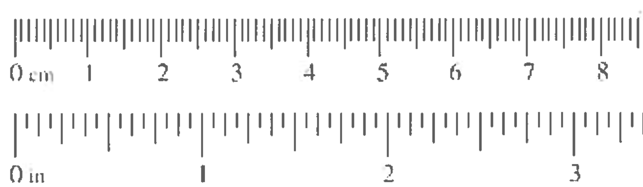


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - [X] Mapping on aerial photograph
   - [ ] Digitized on computer
   - [X] GPS
   - [ ] Other:

Wentworth Size Classes

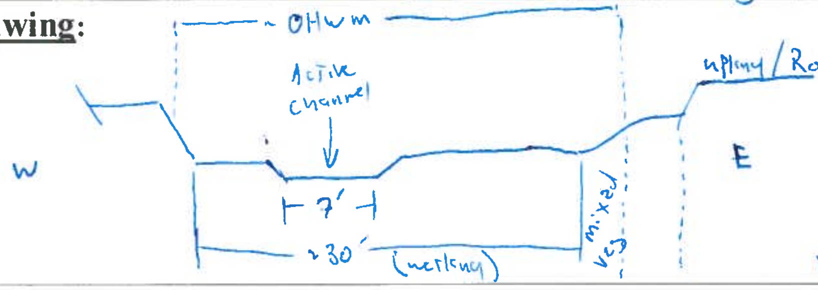
Inches (in)		Millimeters (mm)	Wentworth size class	
			Boulder	Gravel
	10.08	256		
			Cobble	
	2.56	64		
			Pebble	
	0.157	4		
			Granule	
	0.079	2.00		
			Very coarse sand	Sand
	0.039	1.00		
			Coarse sand	
	0.020	0.50		
			Medium sand	
1/2	0.0098	0.25		
			Fine sand	
1/4	0.005	0.125		
			Very fine sand	
1/8	0.0025	0.0625		
			Coarse silt	Silt
1/16	0.0012	0.031		
			Medium silt	
1/32	0.00061	0.0156		
			Fine silt	
1/64	0.00031	0.0078		
			Very fine silt	
1/128	0.00015	0.0039		
			Clay	Mud



Berryessa Crk

Project ID: Reach 1A **Cross section ID:** 1 **Date:** 25 Aug '14 **Time:** 1135 hrs.

Cross section drawing:



* H2O ~ 1' deep, Flowing

OHWM

GPS point: OHW-EB-1, OHW-WB-2

Indicators:

- [ ] Change in average sediment texture
- [x] Change in vegetation species
- [x] Change in vegetation cover
- [x] Break in bank slope
- [ ] Other: ____________
- [ ] Other: ____________

Comments: Clear Topographic break ~ ↑ of 1-2' in elevation, matches w/ boggy wetland hydrology & hydrophitic plants, plants above break are weedy ruderal upland sp.

• Sediment is Sandy Fine w/ limited gravel throughout cx

Floodplain unit: [x] Low-Flow Channel [x] Active Floodplain [ ] Low Terrace

GPS point: OHW-EB-1, OHW-WB-2

Characteristics of the floodplain unit:

Average sediment texture: Fine - Med Sand

Total veg cover: 100 % Tree: 0 % Shrub: 0 % Herb: 100 %

Community successional stage:

- [x] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

* Maintained & disturbed veg - altered & not able to succeed.

Indicators:

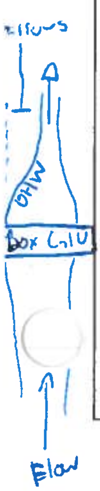
- [ ] Mudcracks
- [ ] Ripples
- [x] Drift and/or debris - shore & in Pepper Tree
- [x] Presence of bed and bank
- [x] Benches - very Clear.
- [ ] Soil development
- [x] Surface relief
- [x] Other: Water Mark in Box Culvert under Rd ~2' above substrate & 36 in below ceiling of Box Culvert, where the Cob ends stop)
- [ ] Other: ____________
- [ ] Other: ____________

* OHWM likely higher in Box Culvert than out of due to constriction & Ease of Flow.

Comments:

• Hydrology Constrained by Concrete revetment & Box Culvert just upstream of reach = likely prevents more variable system - OHW is consistent & similar to mOHW & Normal Flows, Sandy soil prevent Cracks From being produced

• OHWM wider on downstream end of Box Culvert due to eddies & scour



Because wetland was w/in OHWM, it was delineated independently (see associated data)

↳ Alternatives = wetland being outside OHW - would be delineated, wetland = OHW - considered a stream - Not delineated.

Project ID: **Cross section ID:** **Date:** **Time:**

Floodplain unit: ☒ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ______________________

Characteristics of the floodplain unit:
Average sediment texture: ______________
Total veg cover: _____ % Tree: _____ % Shrub: _____ % Herb: _____ %
Community successional stage:
- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:
- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ______________
- ☐ Other: ______________
- ☐ Other: ______________

Comments:

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ______________________

Characteristics of the floodplain unit:
Average sediment texture: ______________
Total veg cover: _____ % Tree: _____ % Shrub: _____ % Herb: _____ %
Community successional stage:
- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:
- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ______________
- ☐ Other: ______________
- ☐ Other: ______________

Comments:

Same as Prior.

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Berryessa (Reach 1)
Project Number:
Stream: Berryessa Crk
Investigator(s): JB / ST

Date: 25 Aug '14 **Time:** 1458
Town: Milpitas **State:** CA
Photo begin file#: **Photo end file#:**

Y [x] / N [ ] Do normal circumstances exist on the site?

Y [x] / N [ ] Is the site significantly disturbed?

Location Details: Berryessa (Reach 1) Reach between Calaveras & Los Coches.

Projection: **Datum:**
Coordinates:

Potential anthropogenic influences on the channel system:

Entire System altered - urbanized & maintained.

Brief site description:

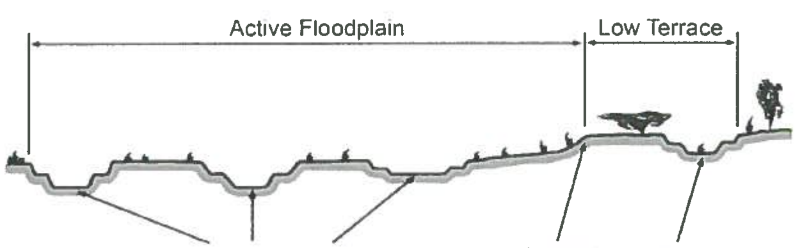
Engineered & Channelized, veg maintained, Flows are artificial

Checklist of resources (if available):

- [x] Aerial photography
  Dates:
- [x] Topographic maps
- [ ] Geologic maps
- [ ] Vegetation maps
- [x] Soils maps
- [ ] Rainfall/precipitation maps
- [x] Existing delineation(s) for site
- [ ] Global positioning system (GPS)
- [ ] Other studies

- [x] Stream gage data
  Gage number:
  Period of record:
  - [ ] History of recent effective discharges
  - [ ] Results of flood frequency analysis
  - [ ] Most recent shift-adjusted rating
  - [x] Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units



Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
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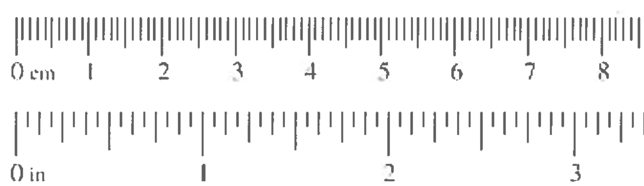
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - [x] Mapping on aerial photograph
   - [ ] Digitized on computer
   - [x] GPS
   - [ ] Other:

Wentworth Size Classes

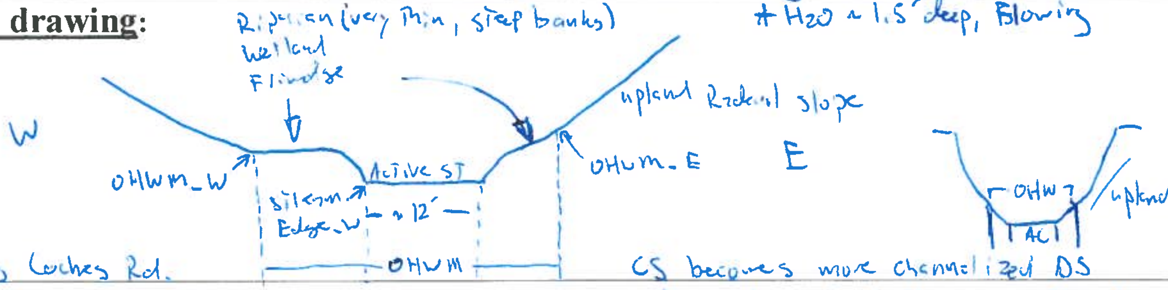
Inches (in)		Millimeters (mm)	Wentworth size class	
			Boulder	Gravel
	10.08	256		
			Cobble	
	2.56	64		
			Pebble	
	0.157	4		
			Granule	
	0.079	2.00		
			Very coarse sand	Sand
	0.039	1.00		
			Coarse sand	
	0.020	0.50		
			Medium sand	
1/2	0.0098	0.25		
			Fine sand	
1/4	0.005	0.125		
			Very fine sand	
1/8	0.0025	0.0625		
			Coarse silt	Silt
1/16	0.0012	0.031		
			Medium silt	
1/32	0.00061	0.0156		
			Fine silt	
1/64	0.00031	0.0078		
			Very fine silt	
1/128	0.00015	0.0039		
			Clay	Mud



Project ID: **Cross section ID:** **Date:** 25 Aug '14 **Time:** 1458

Cross section drawing:

+ H2O ~ 1.5' deep, Flowing



+ as below Los Coches Rd.

CS becomes more channelized DS above Calaveras Blvd, CS becomes slightly wider + Riprap is present w/ in active channel - diversity is it but not the XS.

OHWM

GPS point: Several

Indicators:

- [x] Change in average sediment texture
- [x] Change in vegetation species
- [x] Change in vegetation cover
- [x] Break in bank slope
- [ ] Other: ____________
- [ ] Other: ____________

Comments:

• Below OHWM, Sediment is Gravel/Sand - Active stream is Sand/Gravel
• Reach is very channelized for ~ 85% of length (uniform on Both banks), 15% has somewhat less channelized structure w/ slight bench on west side.

Floodplain unit: [x] Low-Flow Channel [x] Active Floodplain [ ] Low Terrace

GPS point: Several

Characteristics of the floodplain unit:

Average sediment texture: Pebble (Ranging From Sand - Cobble)

Total veg cover: 100 % Tree: Ø % Shrub: Ø % Herb: 100 %

Community successional stage:

- [x] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

See Prior Form.

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [x] Drift and/or debris
- [x] Presence of bed and bank
- [x] Benches
- [x] Soil development - Sorted Soil (Lg on upper bench) (sm on lower bench)
- [ ] Surface relief
- [ ] Other: ____________
- [ ] Other: ____________
- [ ] Other: ____________

Comments: Same plant sp as Reach 1A.

wetland Fringe present but same bench as OHWM - Did not sample wetland independently (~ 1' wide)
→ very thin → - " " " " "

Project ID: **Cross section ID:** **Date:** **Time:**

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ____________________________

Characteristics of the floodplain unit:
Average sediment texture: ___________________
Total veg cover: _____ % Tree: _____% Shrub: _____% Herb: _____%
Community successional stage:
☐ NA ☐ Mid (herbaceous, shrubs, saplings)
☐ Early (herbaceous & seedlings) ☐ Late (herbaceous, shrubs, mature trees)

Indicators:
☐ Mudcracks ☐ Soil development
☐ Ripples ☐ Surface relief
☐ Drift and/or debris ☐ Other: _____________________
☐ Presence of bed and bank ☐ Other: _____________________
☐ Benches ☐ Other: _____________________

Comments:

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ____________________________

Characteristics of the floodplain unit:
Average sediment texture: ___________________
Total veg cover: _____ % Tree: _____% Shrub: _____% Herb: _____%
Community successional stage:
☐ NA ☐ Mid (herbaceous, shrubs, saplings)
☐ Early (herbaceous & seedlings) ☐ Late (herbaceous, shrubs, mature trees)

Indicators:
☐ Mudcracks ☐ Soil development
☐ Ripples ☐ Surface relief
☐ Drift and/or debris ☐ Other: _____________________
☐ Presence of bed and bank ☐ Other: _____________________
☐ Benches ☐ Other: _____________________

Comments:

Same as Prior

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Berryessa Creek (Reach 2)	**Date:** 25 Aug '14	**Time:** 1600 hrs
Project Number:	**Town:** Milpitas	**State:** CA
Stream: Berryessa Crk.	**Photo begin file#:**	**Photo end file#:**
Investigator(s): JB/ST		

Y [X] / N [ ] Do normal circumstances exist on the site?

Y [X] / N [ ] Is the site significantly disturbed?

Location Details: Berryessa (Reach 2) Los Coches - (Piedmont Crk)

Projection: **Datum:**

Coordinates:

Potential anthropogenic influences on the channel system:

Entire System altered - Urbanized + maintained

Brief site description:

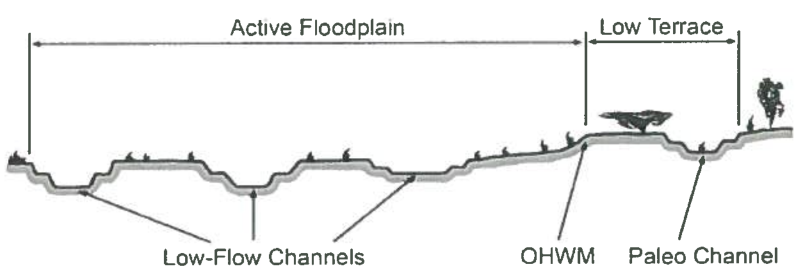
Engineered + Channelized, Veg maintained, Flows are artificial

Checklist of resources (if available):

- [X] Aerial photography
  Dates:
- [X] Topographic maps
- [ ] Geologic maps
- [ ] Vegetation maps
- [X] Soils maps
- [ ] Rainfall/precipitation maps
- [X] Existing delineation(s) for site
- [ ] Global positioning system (GPS)
- [ ] Other studies

- [X] Stream gage data
  Gage number:
  Period of record:
  - [ ] History of recent effective discharges
  - [ ] Results of flood frequency analysis
  - [ ] Most recent shift-adjusted rating
  - [X] Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units



Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
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   - [ ] Other:

Wentworth Size Classes

Inches (in)		Millimeters (mm)	Wentworth size class	
			Boulder	Gravel
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	0.157	4		
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	0.079	2.00		
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	0.039	1.00		
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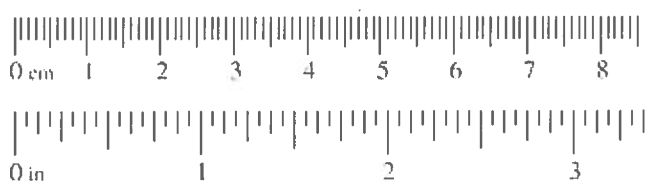
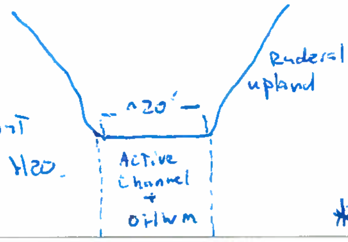
	0.020	0.50		
			Medium sand	
1/2	0.0098	0.25		
			Fine sand	
1/4	0.005	0.125		
			Very fine sand	
1/8	0.0025	0.0625		
			Coarse silt	Silt
1/16	0.0012	0.031		
			Medium silt	
1/32	0.00061	0.0156		
			Fine silt	
1/64	0.00031	0.0078		
			Very fine silt	
1/128	0.00015	0.0039		
			Clay	Mud



Project ID: **Cross section ID:** **Date:** 25Aug '14 **Time:** 1600 hrs.

Cross section drawing:

* upstream of Piedmont Crk; Little [illegible] surface H2O, Downstream
To NO surface H2O from Piedmont Crk.
↳ Channel the same, however, but has more emergents than open H2O.



* H2O ~ 1.5' deep, flowing

OHWM

GPS point: Several

Indicators:

- [ ] Change in average sediment texture
- [x] Change in vegetation species
- [x] Change in vegetation cover
- [ ] Break in bank slope
- [ ] Other: ______
- [ ] Other: ______

Comments:

OHWM = Stream Edge = wetland boundary

Floodplain unit:

- [ ] Low-Flow Channel
- [x] Active Floodplain
- [ ] Low Terrace

GPS point: Several

Characteristics of the floodplain unit:

Average sediment texture: Pebble (Ranging From Sand-Cobble)

Total veg cover: 100 % Tree: Ø % Shrub: Ø % Herb: 100 %

Community successional stage:

- [x] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

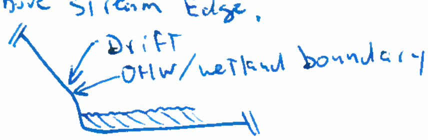
Same as prior

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [x] Drift and/or debris
- [x] Presence of bed and bank
- [x] Benches
- [ ] Soil development
- [x] Surface relief
- [ ] Other: ______
- [ ] Other: ______
- [ ] Other: ______

Comments:

• very incised Channel - very narrow/none wetland fringe - just transition from open water to upland
• Drift present vertically above stream Edge.
wetland ~1' wide



Project ID: **Cross section ID:** **Date:** **Time:**

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ____________________________

Characteristics of the floodplain unit:
Average sediment texture: __________________
Total veg cover: _____ % Tree: _____% Shrub: _____% Herb: _____%
Community successional stage:
- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:
- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ____________________
- ☐ Other: ____________________
- ☐ Other: ____________________

Comments:

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ____________________________

Characteristics of the floodplain unit:
Average sediment texture: __________________
Total veg cover: _____ % Tree: _____% Shrub: _____% Herb: _____%
Community successional stage:
- ☐ NA
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- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ____________________
- ☐ Other: ____________________
- ☐ Other: ____________________

Comments:

Same as prior

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Berryessa Crk (Reach 2/3) **Date:** 25 Aug '14 **Time:** 1658
Project Number: **Town:** Milpitas **State:** CA
Stream: Berryessa Crk **Photo begin file#:** **Photo end file#:**
Investigator(s): JB/ST

Y [X] / N [ ] Do normal circumstances exist on the site?

Y [X] / N [ ] Is the site significantly disturbed?

Location Details: Berryessa (Reach 2 ~~X~~ 3) Piedmont Creek

Projection: **Datum:**
Coordinates:

Potential anthropogenic influences on the channel system:

Entire System altered - urbanized + maintained.

Brief site description:

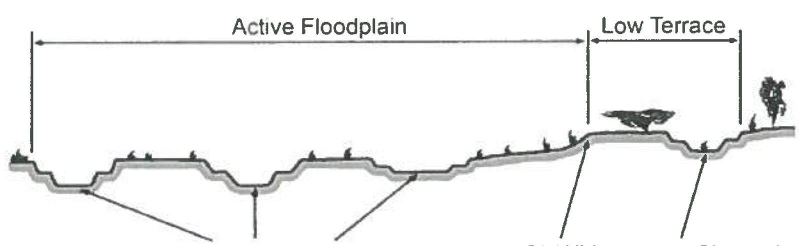
Engineered + Channelized, Veg maintained, Flows are artificial

Checklist of resources (if available):

- [X] Aerial photography
  Dates:
- [X] Topographic maps
- [ ] Geologic maps
- [ ] Vegetation maps
- [X] Soils maps
- [ ] Rainfall/precipitation maps
- [X] Existing delineation(s) for site
- [ ] Global positioning system (GPS)
- [ ] Other studies

- [X] Stream gage data
  Gage number:
  Period of record:
  - [ ] History of recent effective discharges
  - [ ] Results of flood frequency analysis
  - [ ] Most recent shift-adjusted rating
  - [X] Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units



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   - [X] GPS
   - [ ] Digitized on computer
   - [ ] Other:

Wentworth Size Classes

Inches (in)		Millimeters (mm)	Wentworth size class	
			Boulder	Gravel
	10.08	256		
			Cobble	
	2.56	64		
			Pebble	
	0.157	4		
			Granule	
	0.079	2.00		
			Very coarse sand	Sand
	0.039	1.00		
			Coarse sand	
	0.020	0.50		
			Medium sand	
1/2	0.0098	0.25		
			Fine sand	
1/4	0.005	0.125		
			Very fine sand	
1/8	0.0025	0.0625		
			Coarse silt	Silt
1/16	0.0012	0.031		
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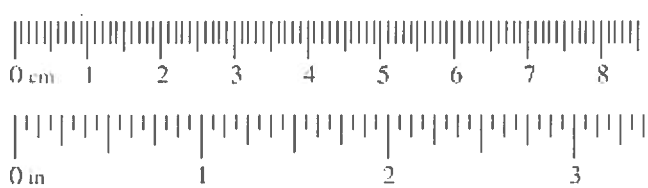
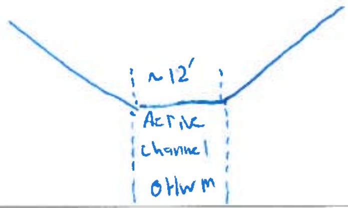
1/32	0.00061	0.0156		
			Fine silt	
1/64	0.00031	0.0078		
			Very fine silt	
1/128	0.00015	0.0039		
			Clay	Mud



Project ID: **Cross section ID:** **Date:** 25 Aug '14 **Time:** 1658

Cross section drawing:

Same basic structure & demitions @S Beryessa downstream of confluence.



* H2O ~1.0' deep, flowing

OHWM

GPS point: Several (N & S points)

Indicators:

- [ ] Change in average sediment texture
- [x] Change in vegetation species
- [x] Change in vegetation cover
- [ ] Break in bank slope
- [ ] Other: ____________
- [ ] Other: ____________

Comments: Same as for downstream section of Beryessa.

Floodplain unit:

- [ ] Low-Flow Channel
- [x] Active Floodplain
- [ ] Low Terrace

GPS point: (N & S pts) Several

Characteristics of the floodplain unit:

Average sediment texture: med Sand

Total veg cover: 100 % Tree: Ø % Shrub: Ø % Herb: 100 %

Community successional stage:

- [x] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

* Same as prior.

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [x] Drift and/or debris
- [x] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [x] Surface relief
- [ ] Other: ____________
- [ ] Other: ____________
- [ ] Other: ____________

Comments:

- Appears to be 1° source of surface H2O downstream on Beryessa.
- Same physical features as adjacent portion of Beryessa.
- wetland $\bar{x}$ = 1' wide

Project ID: **Cross section ID:** **Date:** **Time:**

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ______________________________

Characteristics of the floodplain unit:

Average sediment texture: ____________________

Total veg cover: _____ % Tree: _____ % Shrub: _____ % Herb: _____ %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ______________________
- ☐ Other: ______________________
- ☐ Other: ______________________

Comments:

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ______________________________

Characteristics of the floodplain unit:

Average sediment texture: ____________________

Total veg cover: _____ % Tree: _____ % Shrub: _____ % Herb: _____ %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
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Indicators:

- ☐ Mudcracks
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- ☐ Drift and/or debris
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- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ______________________
- ☐ Other: ______________________
- ☐ Other: ______________________

Comments:

Same as Prior.

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Berryessa Crk
Project Number:
Stream: Berryessa Crk
Investigator(s): JB/ST

Date: 25 Aug 2014
Town: Milpitas
Photo begin file#:

Time: 1715
State: CA
Photo end file#:

Y [X] / N [ ] Do normal circumstances exist on the site?

Y [X] / N [ ] Is the site significantly disturbed?

Location Details: Berryessa (Reach 3) Piedmont Crk - Yosemite Bridge (Rd)

Projection:
Datum:
Coordinates:

Potential anthropogenic influences on the channel system:

Same as previous

Brief site description:

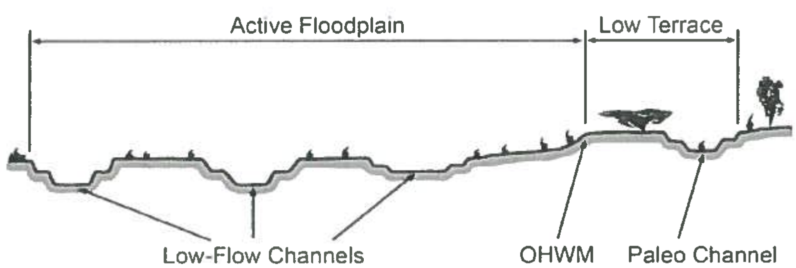
Same as previous.

Checklist of resources (if available):

- [X] Aerial photography
  Dates:
- [X] Topographic maps
- [ ] Geologic maps
- [ ] Vegetation maps
- [X] Soils maps
- [ ] Rainfall/precipitation maps
- [X] Existing delineation(s) for site
- [ ] Global positioning system (GPS)
- [ ] Other studies

- [X] Stream gage data
  Gage number:
  Period of record:
  - [ ] History of recent effective discharges
  - [ ] Results of flood frequency analysis
  - [ ] Most recent shift-adjusted rating
  - [X] Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units



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   - [X] GPS
   - [ ] Other:

Wentworth Size Classes

Inches (in)		Millimeters (mm)	Wentworth size class	
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	10.08	256		
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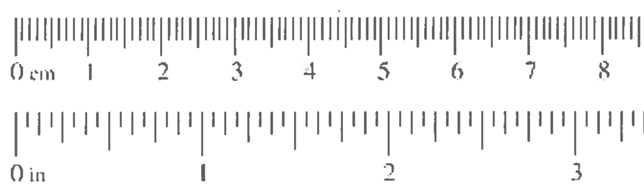
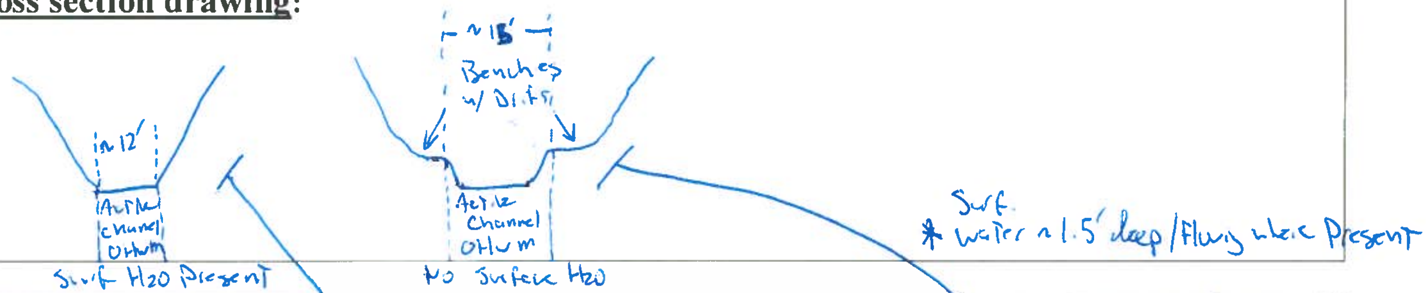


Project ID: **Cross section ID:** **Date:** 25 Aug 2014 **Time:** 1715.

Cross section drawing:

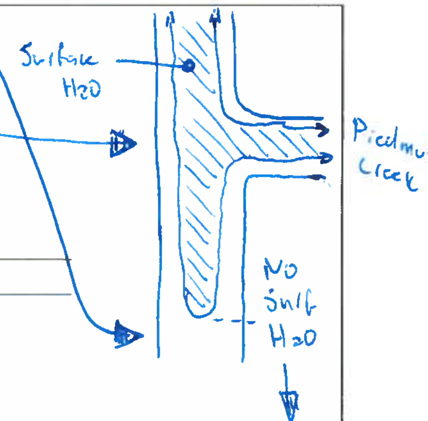


OHWM

GPS point: Several

Indicators:

- [ ] Change in average sediment texture
- [X] Change in vegetation species
- [X] Change in vegetation cover
- [X] Break in bank slope
- [ ] Other: ______
- [ ] Other: ______



Comments:

- XS w/ No/Little benches - Same as downstream portions of Berryessa.
- XS w/ Benches - No Surf H2O present, channel dry w/ hydrophytic sp - bench slope very steep causing Active Channel Edge = "wetland" boundary - No delin performed.

OHW = wetland = OHWM.

Floodplain unit:

- [■] Low-Flow Channel
- [X] Active Floodplain
- [ ] Low Terrace

GPS point: Several

Characteristics of the floodplain unit:

Average sediment texture: Pebble (Ranging From Sand - Cobble)

Total veg cover: 100 % Tree: ∅ % Shrub: ∅ % Herb: 100 %

Community successional stage:

- [X] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

See prior

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [X] Drift and/or debris
- [X] Presence of bed and bank
- [X] Benches
- [ ] Soil development
- [X] Surface relief
- [ ] Other: ______
- [ ] Other: ______
- [ ] Other: ______

Comments:

Same plants in prior reach, benches partially mowed - mostly upland sp. wetland $\bar{x}$ = 1' wide.

Project ID: **Cross section ID:** **Date:** **Time:**

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ______________________

Characteristics of the floodplain unit:

Average sediment texture: ______________

Total veg cover: _____ % Tree: _____ % Shrub: _____ % Herb: _____ %

Community successional stage:

☐ NA
☐ Early (herbaceous & seedlings)
☐ Mid (herbaceous, shrubs, saplings)
☐ Late (herbaceous, shrubs, mature trees)

Indicators:

☐ Mudcracks
☐ Ripples
☐ Drift and/or debris
☐ Presence of bed and bank
☐ Benches
☐ Soil development
☐ Surface relief
☐ Other: ______________
☐ Other: ______________
☐ Other: ______________

Comments:

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ______________________

Characteristics of the floodplain unit:

Average sediment texture: ______________

Total veg cover: _____ % Tree: _____ % Shrub: _____ % Herb: _____ %

Community successional stage:

☐ NA
☐ Early (herbaceous & seedlings)
☐ Mid (herbaceous, shrubs, saplings)
☐ Late (herbaceous, shrubs, mature trees)

Indicators:

☐ Mudcracks
☐ Ripples
☐ Drift and/or debris
☐ Presence of bed and bank
☐ Benches
☐ Soil development
☐ Surface relief
☐ Other: ______________
☐ Other: ______________
☐ Other: ______________

Comments:

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Berryessa Crk	**Date:** 26 Aug '14	**Time:** 0904 hrs
Project Number:	**Town:** Milpitas	**State:** CA
Stream: Berryessa Crk	**Photo begin file#:**	**Photo end file#:**
Investigator(s): DB/ST		

Y [X] / N [ ] Do normal circumstances exist on the site?	**Location Details:** Berryessa (Reach 3) above Yosemite Rd - Montague Exp way
Y [X] / N [ ] Is the site significantly disturbed?	**Projection:** **Datum:** **Coordinates:**

Potential anthropogenic influences on the channel system:

Same as prior. Numerous armored culvert inlets - All/most heavily eroded & perched.

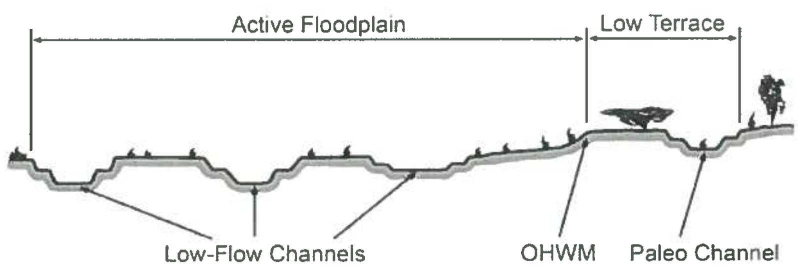
Brief site description:

" " "

Checklist of resources (if available):

- [X] Aerial photography
  Dates:
- [X] Topographic maps
- [ ] Geologic maps
- [ ] Vegetation maps
- [X] Soils maps
- [X] Rainfall/precipitation maps
- [X] Existing delineation(s) for site
- [ ] Global positioning system (GPS)
- [ ] Other studies
- [X] Stream gage data
  Gage number:
  Period of record:
  - [ ] History of recent effective discharges
  - [ ] Results of flood frequency analysis
  - [ ] Most recent shift-adjusted rating
  - [X] Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units



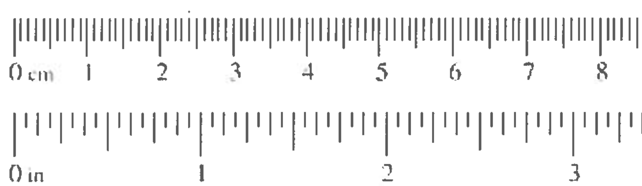
Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:

[X] Mapping on aerial photograph	[X] GPS
[ ] Digitized on computer	[ ] Other:

Wentworth Size Classes

Inches (in)		Millimeters (mm)	Wentworth size class	
			Boulder	Gravel
	10.08	256		
			Cobble	
	2.56	64		
			Pebble	
	0.157	4		
			Granule	
	0.079	2.00		
			Very coarse sand	Sand
	0.039	1.00		
			Coarse sand	
	0.020	0.50		
			Medium sand	
1/2	0.0098	0.25		
			Fine sand	
1/4	0.005	0.125		
			Very fine sand	
1/8	0.0025	0.0625		
			Coarse silt	Silt
1/16	0.0012	0.031		
			Medium silt	
1/32	0.00061	0.0156		
			Fine silt	
1/64	0.00031	0.0078		
			Very fine silt	
1/128	0.00015	0.0039		
			Clay	Mud



Project ID: **Cross section ID:** **Date:** 26 Aug '14 **Time:** 0904 hrs.

Cross section drawing:

+ H2O - Pockets of Standing - Last Flow in Late spring

OHWM

GPS point: Several

Indicators:

- [ ] Change in average sediment texture
- [x] Change in vegetation species
- [x] Change in vegetation cover
- [x] Break in bank slope
- [ ] Other: ______
- [ ] Other: ______

Comments: Similar to previous

Floodplain unit: [ ] Low-Flow Channel [x] Active Floodplain [ ] Low Terrace

GPS point: Several

Characteristics of the floodplain unit:

Average sediment texture: Gravel - Pebble (Riprap + Cobble also present)

Total veg cover: 70 % Tree: Ø % Shrub: Ø % Herb: 100 %

Community successional stage:

- [x] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

• Disturbed sys - Not Successional

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [x] Drift and/or debris - 1° indicator
- [x] Presence of bed and bank
- [x] Benches - captures drift.
- [x] Soil development
- [x] Surface relief
- [ ] Other: ______
- [ ] Other: ______
- [ ] Other: ______

Comments:

Project ID: **Cross section ID:** **Date:** **Time:**

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ____________________________

Characteristics of the floodplain unit:

Average sediment texture: ___________________

Total veg cover: _____ % Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: _____________________
- ☐ Other: _____________________
- ☐ Other: _____________________

Comments:

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ____________________________

Characteristics of the floodplain unit:

Average sediment texture: ___________________

Total veg cover: _____ % Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: _____________________
- ☐ Other: _____________________
- ☐ Other: _____________________

Comments:

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Berryessa Crk	**Date:** 26 Aug '14	**Time:** 1112
Project Number:	**Town:** Milpitas	**State:** CA
Stream: Berryessa Crk	**Photo begin file#:**	**Photo end file#:**
Investigator(s): JB/ST		

Y [X] / N [ ] Do normal circumstances exist on the site?	**Location Details:** Berryessa Crk Reach 4) Montague Exp Bridge - End Proj
Y [X] / N [ ] Is the site significantly disturbed?	**Projection:** **Datum:** **Coordinates:**

Potential anthropogenic influences on the channel system:

Same as Prior Reaches, 2 Prominant Concreted Sections Forming 90° bends in This Reach.

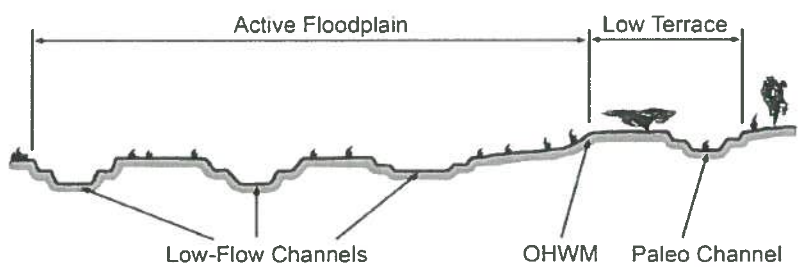
Brief site description:

" " ", heavily altered/engineered, almost entirely dry (surface)

Checklist of resources (if available):

- [X] Aerial photography
  Dates:
- [X] Topographic maps
- [ ] Geologic maps
- [ ] Vegetation maps
- [X] Soils maps
- [ ] Rainfall/precipitation maps
- [X] Existing delineation(s) for site
- [ ] Global positioning system (GPS)
- [ ] Other studies
- [X] Stream gage data
  Gage number:
  Period of record:
  - [ ] History of recent effective discharges
  - [ ] Results of flood frequency analysis
  - [ ] Most recent shift-adjusted rating
  - [X] Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

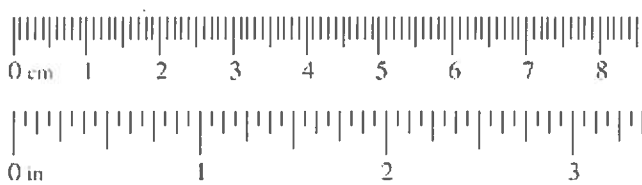


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - [X] Mapping on aerial photograph
   - [ ] Digitized on computer
   - [X] GPS
   - [ ] Other:

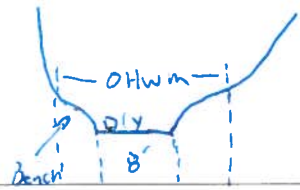
Wentworth Size Classes

Inches (in)		Millimeters (mm)	Wentworth size class	
			Boulder	Gravel
	10.08	256		
			Cobble	
	2.56	64		
			Pebble	
	0.157	4		
			Granule	
	0.079	2.00		
			Very coarse sand	Sand
	0.039	1.00		
			Coarse sand	
	0.020	0.50		
			Medium sand	
1/2	0.0098	0.25		
			Fine sand	
1/4	0.005	0.125		
			Very fine sand	
1/8	0.0025	0.0625		
			Coarse silt	Silt
1/16	0.0012	0.031		
			Medium silt	
1/32	0.00061	0.0156		
			Fine silt	
1/64	0.00031	0.0078		
			Very fine silt	
1/128	0.00015	0.0039		
			Clay	Mud



Project ID: **Cross section ID:** **Date:** 26 Aug 2014 **Time:** 1112

Cross section drawing:



XS varies slightly in width (Due To Concrete Sections) & prominence of benches
Benches are never prominent but are present in some places.

OHWM

GPS point: Several (Note: Stream Extends both N-S & E-W in Reach 4)

Indicators:

- [x] Change in average sediment texture
- [x] Change in vegetation species
- [x] Change in vegetation cover - 1° indicator although more hydrophitic sp tend to be present in stream rather than out
- [x] Break in bank slope
- [ ] Other: ______
- [ ] Other: ______

Comments:

-Sediment varies - Typically larger & more sorted in active channel.

Floodplain unit:

- [ ] Low-Flow Channel
- [x] Active Floodplain
- [ ] Low Terrace

GPS point: Several (N-S, E-W Sections)

* Some riparian Trees are present in areas (Populus, Quercus, Sambucus,) but all are well outside of OHWM.

Characteristics of the floodplain unit:

Average sediment texture: gravel-Pebble w/ some cobble

Total veg cover: 60 % Tree: 0 % Shrub: 0 % Herb: 100 %

Community successional stage:

- [x] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Disturbed - No succession occuring.

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [x] Drift and/or debris - 1° indicator
- [x] Presence of bed and bank
- [x] Benches - Active Channel incised below OHW Bench
- [ ] Soil development
- [x] Surface relief
- [ ] Other: ______
- [ ] Other: ______
- [ ] Other: ______

Comments:

- Channel uniform from Montague Exp - Concrete-lined bend.
- " relatively wider above Concrete-lined bend - still incised & weedy - First bend
- " is maintained until Toe of Second Concrete-lined bend, as well as above bend.

Project ID: **Cross section ID:** **Date:** **Time:**

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ____________________________

Characteristics of the floodplain unit:

Average sediment texture: ___________________

Total veg cover: _____ % Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: _____________________
- ☐ Other: _____________________
- ☐ Other: _____________________

Comments:

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ____________________________

Characteristics of the floodplain unit:

Average sediment texture: ___________________

Total veg cover: _____ % Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: _____________________
- ☐ Other: _____________________
- ☐ Other: _____________________

Comments:

APPENDIX C: GROUND LEVEL COLOR PHOTOGRAPHS

Photo: 1	Looking: Downstream	Notes: Reach 4

Photo: 2	Looking: Downstream from active channel	Notes: Reach 3

Photo: 3	Looking: Upstream at urban environment	Notes: Reach 1A

Photo: 4	Looking: Upstream across disturbed channel	Notes: Reach 3

Photo: 5	Looking: Upstream at wetland veg (Wetland 1)	Notes: Reach 1A

Photo: 6	Looking: Downstream at wetland/upland boundary	Notes: Reach 1A

Photo: 7	Looking: Upstream, overview	Notes: Reach 1

Photo: 8	Looking: Upstream, overview	Notes: Reach 2

Photo: 9	Looking: Upstream, overview	Notes: Reach 4

Photo: 10	Observation: Drift at base of gage	Notes: Reach 4

Photo: 11	Observation: Drift deposit	Notes: Reach 4
		
Photo: 12	**Observation: Drift deposit at base of gage**	**Notes: Reach 4**
		

Photo: 13	Observation: Drift deposit	Notes: Reach 1A

Photo: 14	Observation: Drift deposit on left of channel	Notes: Reach 3

Photo: 15	Observation: Change in sediment – scour line	Notes: Reach 3

Photo: 16	Looking: Upstream, Piedmont Creek	Notes: Between Reach 2 and 3

Photo: 17	Looking: Downstream at Wetland 1	Notes: Reach 1A

Photo: 18	Observation: Head cutting	Notes: Reach 3

APPENDIX D: LITERATURE CITATIONS

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Appendix D Geotechnical Report

GEOTECHNICAL APPENDIX
UPPER BERRYESSA CREEK FLOOD RISK MANAGEMENT PROJECT
I-680 TO CALAVERAS BOULEVARD
SANTA CLARA COUNTY
MILPITAS, CALIFORNIA

Prepared for:

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3686

Prepared by:

Tetra Tech, Inc.
17885 Von Karman Avenue, Suite 500
Irvine, California 92614-6213

Final

April 3, 2015

TABLE OF CONTENTS

TABLES

FIGURES

ATTACHMENTS

GEOTECHNICAL APPENDIX

UPPER BERRYESSA CREEK FLOOD RISK MANAGEMENT PROJECT

SANTA CLARA COUNTY

MILPITAS, CALIFORNIA

1. INTRODUCTION

This Appendix presents the results of the geotechnical explorations and analyses for the Berryessa Creek Flood Risk Management Project (Project). The project consists of improvements to the existing channel to increase the hydraulic capacity of the channel. The improvements consist of widening the base of the channel, adding a short floodwall in one area, scour protection, grade control structures, a low-height levee, and a new culvert for the Union Pacific Railroad (UPRR) over the creek. A location map of the Project is presented on **Figure 1**.

The explorations were performed in a phased approach based on a review of the available and existing subsurface information, borings, and test results. The initial exploration phase of the subsurface exploration (Phase I) for this project was performed using Cone Penetrometer Testing (CPT) borings at representative and critical locations, or in areas with limited existing, subsurface information. Phase II of the exploration was performed to supplement the results of the Phase I exploration, and was performed with Standard Penetration Testing (SPT) borings to refine the findings from the Phase I exploration and to obtain samples for index and shear strength testing.

The geotechnical analyses and evaluations performed for the improvements included stability analyses of the proposed channel configuration, foundation recommendations for the new UPRR culvert and the short floodwall, settlement evaluations for the short floodwall and low-height levee, and construction recommendations for the proposed improvements.

It should be noted that the Project lies within an area of known environmental contamination and several environmental explorations and evaluations have been performed in the area over the years. There are environmental issues that need to be addressed as part of the design and construction of this project. However, this appendix presents only the geotechnical considerations for the Project. The environmental aspects of this project will be considered and addressed in a separate document.

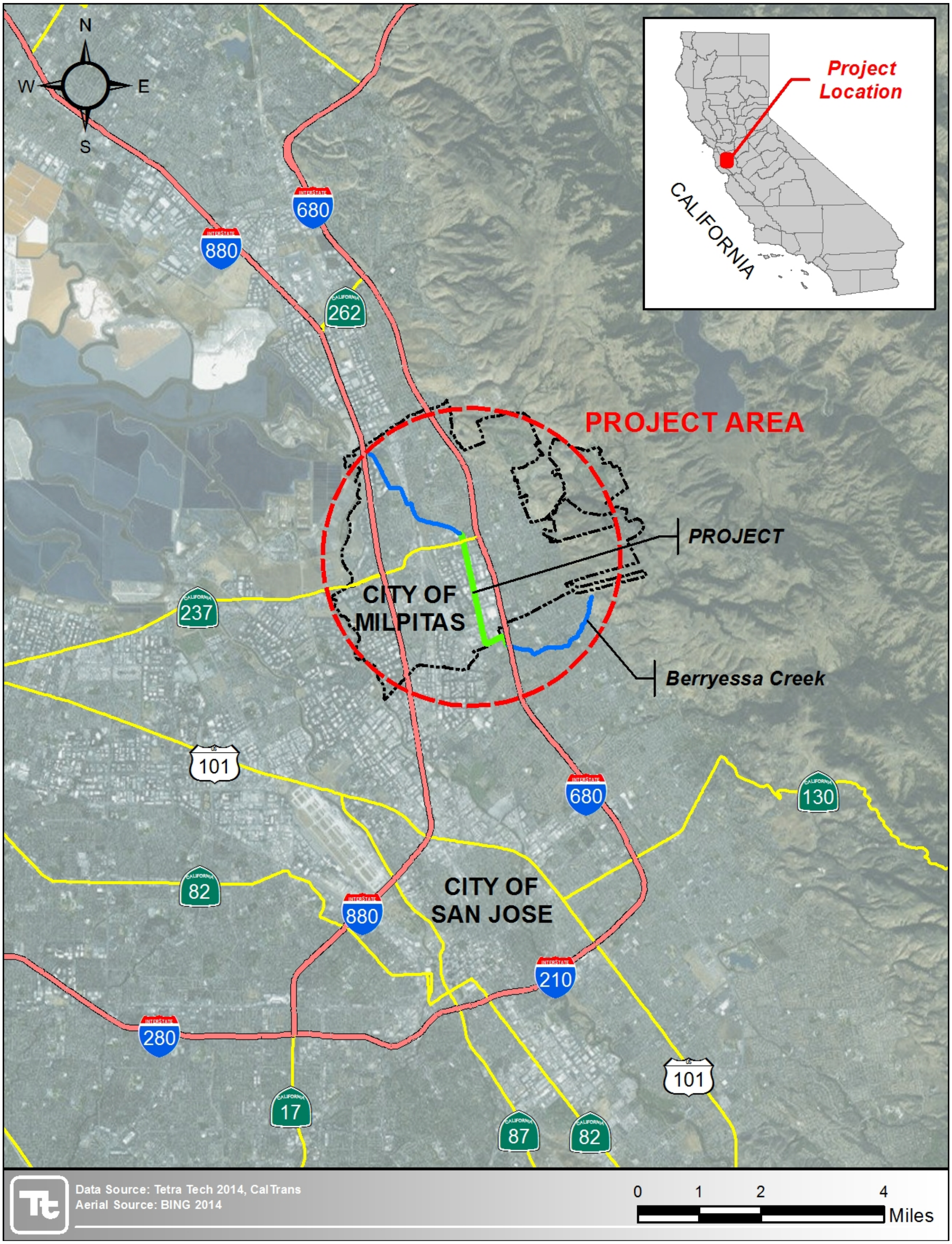

Figure 1. Project Location Map

2. PROJECT DESCRIPTION

2.1. Channel Improvements

The project consists of the improvements to the Berryessa Creek Channel between Calaveras Boulevard (Station 86+00) and I-680 (Station 193+00). In general, the channel improvements will consist of widening the existing channel, installing slope protection on the channel slopes, and using a short floodwall in on the left bank between Stations 103+50 and 115+23 and Stations 171+00 and 175+50 to maintain flows in the channel.

At the time this geotechnical appendix was prepared, the designs of the various elements of the channel improvements were at a 60% design level. The channel will be widened, deepened slightly, and the slopes will be graded to a consistent 2H:1V slope. The bottom of the channel will vary in width between 15 and 40 feet. Erosion protection will be placed on the channel slopes. This erosion protection will consist of rip rap on the lower portion of the slope and geocells filled with aggregate or concrete on the upper portion of the slope.

2.2. UPRR Trestle

The current plans call for the demolition of the existing UPRR timber trestle bridge over Berryessa Creek near station 160+85 and replacing it with a two-cell, reinforced-concrete box culvert. The 60% design plans indicate that each of the two cells on the proposed culvert will be 10 feet wide and 9 feet high. The invert of the culvert is approximately one foot below the lowest current elevation in the existing creek.

3. REGIONAL GEOLOGY

The subject site is located within the northeastern portion of the Santa Clara Valley approximately 5 miles southeast of the San Francisco Bay. The Santa Clara Valley lies within the Coast Ranges Geomorphic Province. The Santa Clara Valley is part of a long, northwest-southeast-trending structural down-block depression known as the as Alum Rock Block which is located between the right lateral strike-slip San Andreas fault to the southwest and the right lateral strike-slip Hayward and Calaveras faults to the northeast and is concealed and overlain by thick Quaternary alluvial sediments. The Alum Rock Block is bound by the Mt. Hamilton Block in the northeast, separated by the right lateral strike-slip Calaveras Fault and the concealed Silver Creek Block in the southwest which extends northwest under the San Francisco Bay. The Alum Rock Block consists of a stack of Mesozoic to Cenozoic strata that was originally deposited on Jurassic Coast Range ophiolite and associated intermediate silicic volcanic rocks. The Quaternary materials consists of Pleistocene and Holocene alluvial Fan Deposits which are overlain by Holocene Basin Deposits associated with the San Francisco Bay.

Based on the United States Geologic Survey (USGS) Geologic Map, of the San Jose 30 X 50-Minute Quadrangle Map, the subject site is mostly covered by Holocene Basin Deposits (Qhb), Upper Pleistocene Alluvial Fan Deposits (Qpf) and Holocene Young Alluvial Fan Deposits (Qhfl). A geologic map of the general project area is shown on Figure 2. Description of the main geologic units are:

> Qhb - Basin Deposits (Holocene) - dark-colored clay and very fine silty clay, rich in organic material;
>
> Qhf1 - Young Alluvial Fan Deposits (Holocene) - (Younger) brown gravelly sand and sandy and clayey gravel, grading upward to sandy and silty clay, moderately dense to dense, coarser near the fan heads and upstream, deposited by flooding streams where they emerge from constrained channels of the uplands;
>
> Qhf2 - Older Alluvial Fan Deposits (Holocene) - (Older) brown gravelly sand and sandy and clayey gravel, grading upward to sandy and silty clay, moderately dense to dense, coarser near the fan heads and upstream, deposited by flooding streams where they emerge from constrained channels of the uplands;
>
> Qpf - Alluvial Fan Deposits (Upper Pleistocene) - light gray/tan to reddish brown gravel, clast supported, clasts typically cobble sized, clayey and sandy matrix, crudely bedded.

4. SUBSURFACE EXPLORATIONS

4.1. General

As mentioned above, the subsurface exploration for the Project was performed in phases. Historic borings along the channel were initially reviewed. The findings from that review were used to develop the Phase I exploration, which consisted of 13 CPT borings drilled at critical and representative locations along the channel. The results of the CPT borings, combined with the historic boring results, were then used to develop the Phase II exploration. The Phase II exploration consisted of 10 SPT borings drilled in areas with no borings and in representative areas to collect samples for laboratory testing.

Borings designated SPT-12 and SPT-13 were drilled specifically for the proposed box culvert. They were located on the left and right bank of the existing Berryessa Creek as close to the existing UPRR timber trestle as was safely feasible. Exploration within the channel bottom for the proposed culvert could not be performed because of permit requirements and project schedule limitations.

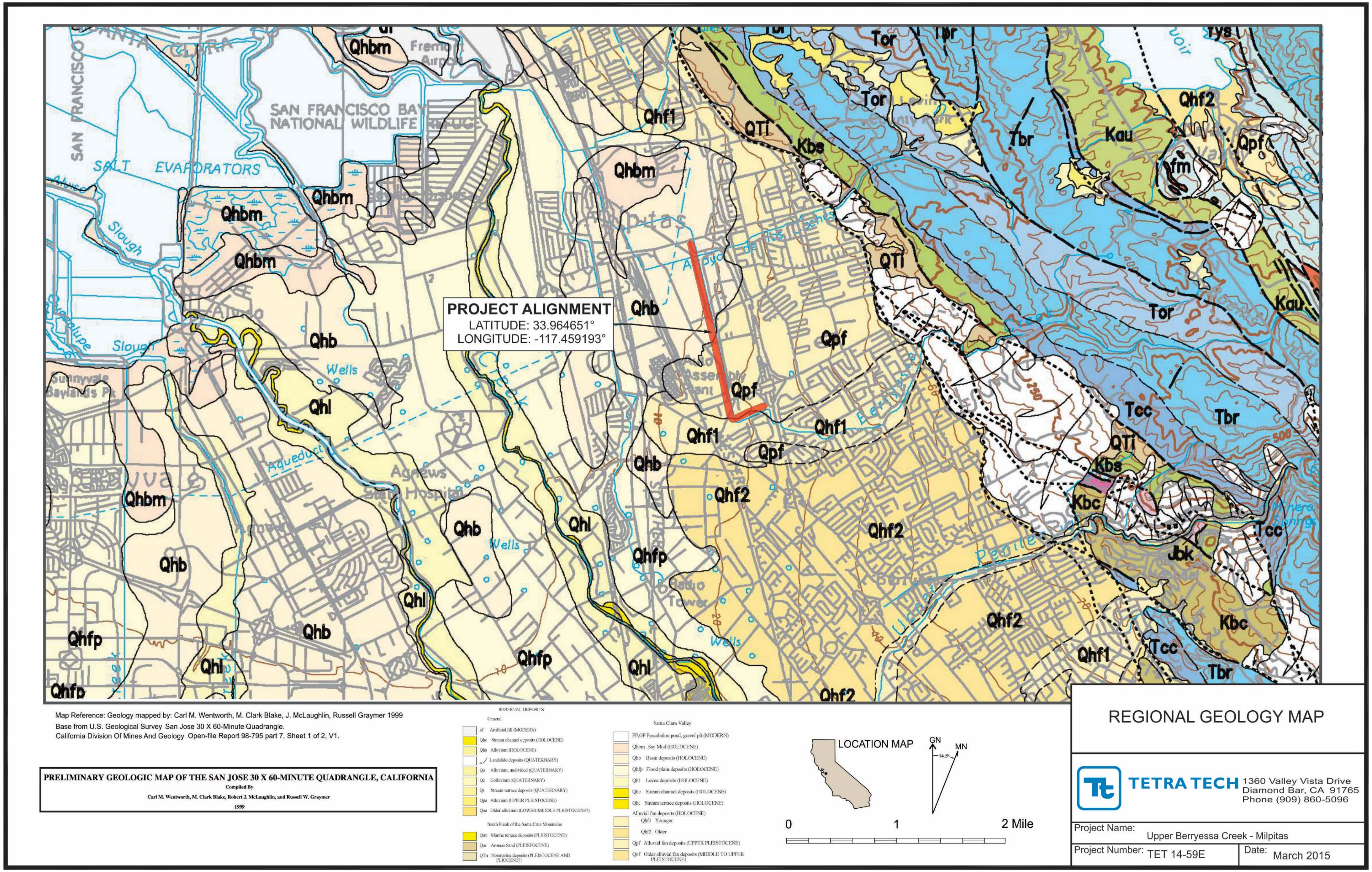

Figure 2. Regional Geology Map

4.2. Historic Borings

To evaluate the existing subsurface conditions along the creek alignment, several previous geotechnical reports were reviewed. However, much of the geologic and geotechnical conditions along the Upper Berryessa Creek Project alignment between Calaveras Boulevard and I-680 were summarized in the Geotechnical Report prepared in 2004 by Parikh Consultants, Inc. (Parikh 2004). The report included data from several geotechnical and environmental studies performed along or adjacent to the creek alignment.

Based on the existing boring information review, the subsurface conditions along the creek alignment below depths of 30 to 40 feet appear to be fairly consistent. Below these depths, the existing borings indicated stiff to hard, overconsolidated silty and sandy clays to the depths of the borings.

However, the upper soils from the ground surface to depths of 30 to 40 feet were more variable. The upper soils were typically overconsolidated silty clays and sandy clays but their consistency was softer and more variable than the lower soils, generally ranging from medium stiff to very stiff. One boring near Montague Expressway encountered upper soils that were very soft to soft to a depth of about 10 feet. These very soft to soft soils may be normally consolidated but they were located in a boring nearly 600 feet east of the channel.

In addition, the upper soils contained seams of granular soil, ranging from clayey sands and gravels to fine sands. These sand seams were not encountered consistently and were encountered at various depths and their thickness varied.

4.3. Groundwater Conditions – Historical Borings

Groundwater was encountered in many of the historical borings within the Project limits at depths varying from approximately 7 to 16 feet below existing grade. Further south along the alignment, near I-680, groundwater was encountered at a depth of 30 feet or more below existing grade.

A plan showing the locations of the historical borings is presented on **Figure 3**. A summary of the historic borings that were considered for the Project and used to develop the Phase I CPT program is shown on **Table 1** on the following pages.

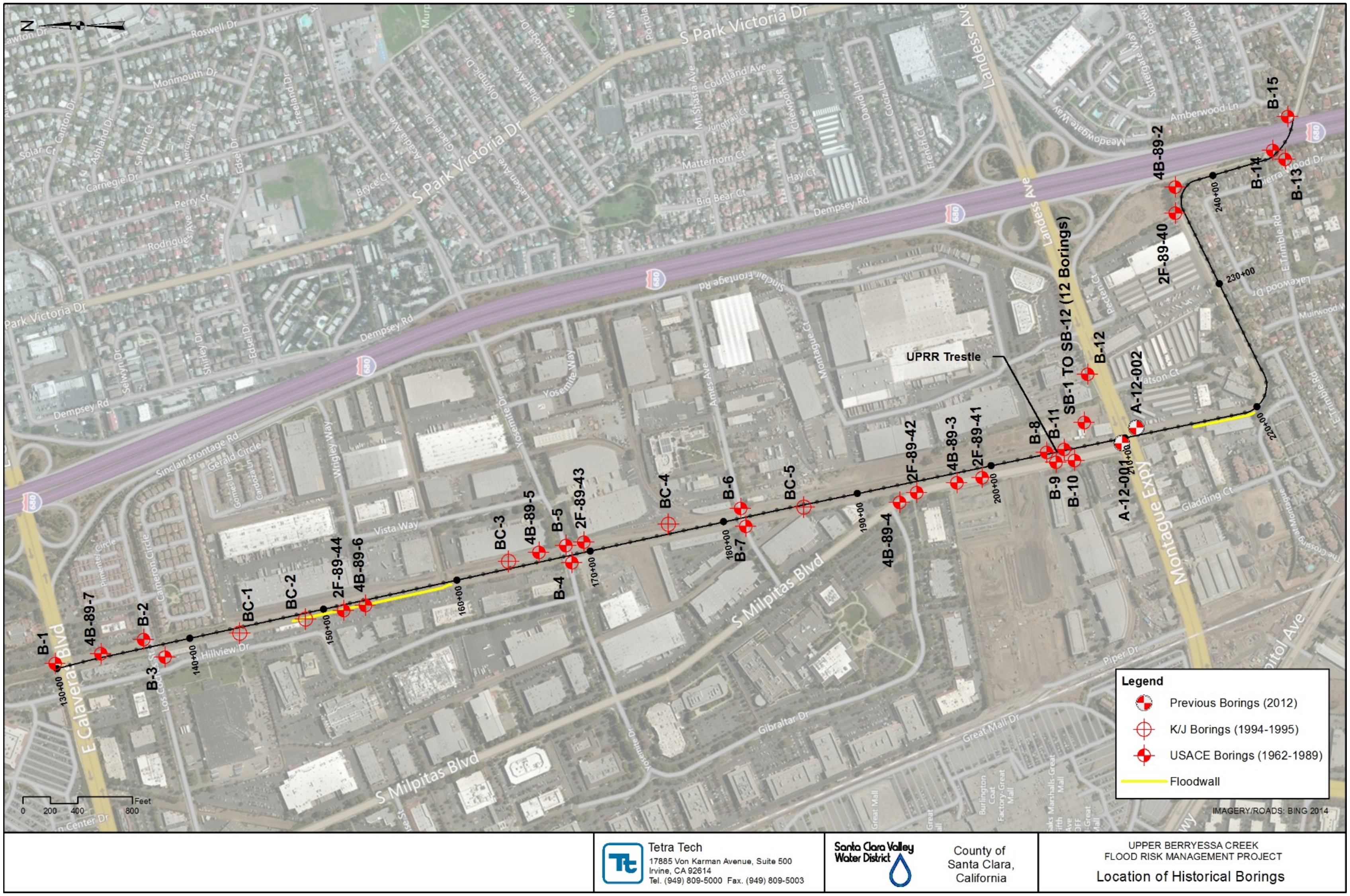

Figure 3. Historic Boring Locations

Table 1. Summary of Historical Boring Information

Boring/Trench Nos. (Date Drilled)	Top Elevation (ft)	Depth (ft)	Bottom Elevation (ft)	Approximate Depth of Groundwater (ft)	N-values (Y/N)	Triaxial Strength Testing (Y/N)	Drilled by	Available Geotechnical Information
B-1 (5/68)	26.0	51.0	-25.0	13.0	Y	N	SCVWD	Moisture content, density, and consolidation testing performed
B-2 (7/66)	29.5	62.0	-32.5	-	Y	N	Caltrans	Moisture content, density, and consolidation testing performed
B-3 (7/66)	29.7	72.0	-42.3	12.0	Y	N		
B-4 (1/72)	40.0	80.0	-40.0	-	Y	N	Geolabs, Inc	Moisture content, density, consolidation, CBR, and direct shear testing performed
B-5 (1/72)	40.5	80.0	-39.5	-	Y	N		
B-6 (1/72)	46.7	85.0	-38.3	-	Y	N		
B-7 (1/72)	46.5	80.0	-33.5	-	Y	N		
B-8 (4/82)	61.0	20.0	41.0	10.0	N	N	J.H. Kleinfelder and Associates	No laboratory testing available
B-9 (4/82)	60.0	20.0	40.0	10.0	N	N		
B-10 (4/82)	60.0	20.0	40.0	10.0	N	N		
B-11 (4/82)	61.0	20.0	41.0	10.0	N	N		
B-12 (4/82)	61.0	20.0	41.0	16.0	N	N		
B-13 (3/66)	77.0	66.5	10.5	32.7	Y	N	Caltrans	No laboratory testing available
B-14 (6/66)	79.0	44.0	35.0	34.7	Y	N		
B-15 (6/66)	79.2	75.0	4.2	34.4	Y	N		

Table 1 (cont.). Summary of Historical Boring Information

Boring/Trench Nos. (Date Drilled)	Top Elevation (ft.)	Depth (ft.)	Bottom Elevation (ft.)	Approximate Depth of Groundwater (ft)	N-values (Y/N)	Triaxial Strength Testing (Y/N)	Drilled by	Available Geotechnical Information
2F-89-40 (4/89)	74.0	20.0	54.0	-	Y	N	USACE	Moisture content, specific gravity, sieve, and Atterberg limit testing performed
2F-89-41 (4/89)	58.0	20.0	38.0	15.6	Y	N		
2F-89-42 (4/89)	53.5	20.0	33.5	-	Y	N		
2F-89-43 (4/89)	41.0	20.0	21.0	12.8	Y	N		
2F-89-44 (4/89)	30.0	20.0	10.0	9.8	Y	N		
BC-1 (2/95)	30.1	17.0	13.1	8.5	Y	N	Kennedy/ Jenks Consultants	No testing available
BC-2 (2/95)	29.0	16.0	13.0	8.4	Y	N		
BC-3 (2/95)	35.9	16.5	19.4	7.5	Y	N		
BC-4 (2/95)	43.2	16.5	26.7	9.0	Y	N		
BC-5 (2/95)	49.7	16.5	33.2	11.0	Y	N		
SB-1 (12/94)	27.6	18.0	9.6	-	N	N		No testing available
SB-2 (12/94)	29.2	19.0	10.2	-	N	N		
SB-3 (12/94)	29.2	20.0	9.2	-	N	N		
SB-4 (12/94)	29.7	18.0	11.7	-	N	N		

Table 1 (cont.). Summary of Historical Boring Information

Boring/Trench Nos. (Date Drilled)	Top Elevation (ft.)	Depth (ft.)	Bottom Elevation (ft.)	Approximate Depth of Groundwater (ft)	N-values (Y/N)	Triaxial Strength Testing (Y/N)	Drilled by	Available Geotechnical Information
SB-5 (12/94)	29.9	20.0	9.9	-	N	N	Kennedy/ Jenks Consultants	No testing available
SB-6 (12/94)	29.1	19.0	10.1	-	N	N		
SB-7 (12/94)	34.6	13.0	21.6	-	N	N		
SB-8 (12/94)	36.9	10.0	26.9	-	N	N		
SB-9 (12/94)	37.8	15.0	22.8	-	N	N		
SB-10 (12/94)	41.4	17.0	24.4	-	N	N		
SB-11 (12/94)	41.5	15.0	26.5	-	N	N		
SB-12 (12/94)	43.1	15.0	28.1	-	N	N		
4B-89-2	74.0	11.0	63.0	-	N	N	USACE	No testing available
4B-89-3	58.3	11.5	46.8	-	N	N		
4B-89-4	53.0	11.5	41.5	-	N	N		
4B-89-5	40.5	10.0	30.5	10.0	N	N		
4B-89-6	30.0	10.3	19.7	9.4	N	N		
4B-89-7	27.5	10.4	17.1	9.7	N	N		
A-12-001	63.0	81.5	-18.5	10.0	Y	N	Parikh	Moisture content, density, Atterberg limits, consolidation, and unconfined strength testing performed
A-12-002	64.0	81.5	-17.5	10.0	Y	N		

4.4. Phase I Subsurface Exploration – CPT Borings

Many of the historical borings available for review were shallow borings (less than 20 feet deep) for environmental purposes or sampling. Consequently, there was little geotechnical testing available. In addition, it was anticipated that the undrained slope stability evaluations for the channel improvements could result in failure surfaces that extended to depths of 30 feet or more, deeper than many of the historical borings. Therefore, while there was existing subsurface data to review and evaluate, there were also significant gaps in the existing data that needed to be explored.

Consequently, the purpose of the Phase I CPT exploration program was to provide additional subsurface information below the bottoms of the historical borings, develop undrained shear strengths that would be used in the geotechnical evaluations for the channel improvements, and to estimate groundwater levels at the time of drilling. This Phase I exploration program consisted of 13 CPT borings drilled at critical or representative locations, or at locations where there was no historical information or the historical information was not deep enough. The CPT borings were drilled between the dates of December 6 and December 7, 2014. All of the CPT borings were advanced to a depth of 40 feet.

A plan showing the locations of the CPT borings is shown on **Figure 4**. Logs of the CPT borings are presented in Attachment A.

4.5. Phase II Subsurface Exploration – SPT Borings

The Phase II Subsurface Exploration consisted of 10 SPT borings drilled to collect samples and to fill in any subsurface data gaps remaining from the CPT boring program. The SPT borings were drilled between the dates of December 10 and December 12, 2014 using 8-inch diameter hollow stem augers and a track-mounted drill rig. The locations of the SPT borings are shown on **Figure 5**. The SPT borings were drilled to depths of 13.5 to 61.5 feet. Both driven ring-type and bulk samples were retrieved at selected depths during drilling. The driven samples were collected utilizing a California-type sampler driven by a 140 pound hammer with a drop of 30 inches. Standard Penetration Testing was also performed using the same auto-trip hammer and drop as for the ring-type samples in general accordance with ASTM D 1586.

After completion of the drilling, groundwater depths were measured and the borings were backfilled with bentonite/cement grout. Details of the field exploration are presented in Attachment A. Logs of the SPT borings are also presented in Attachment A.

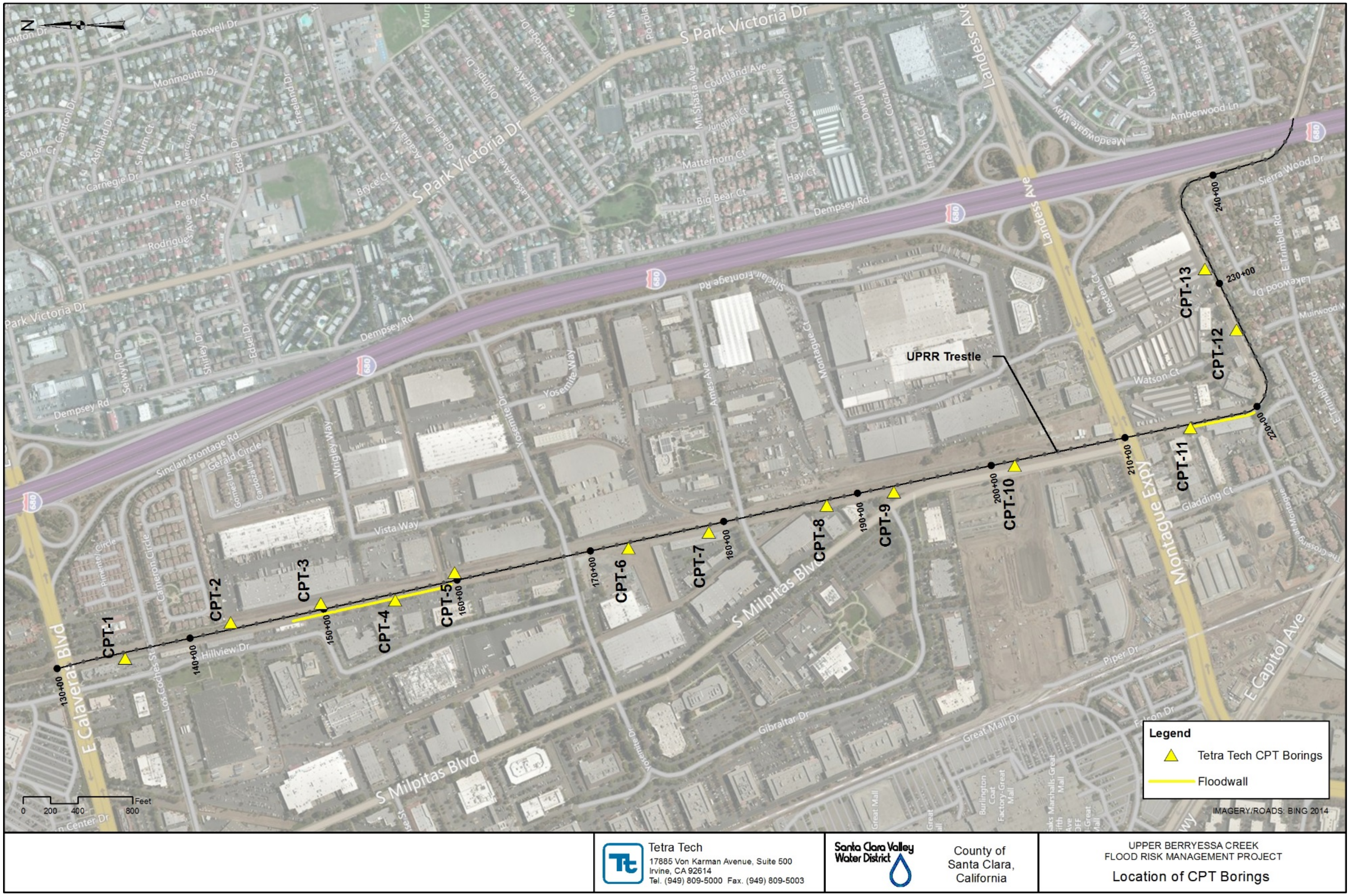

Figure 4. CPT Boring Locations

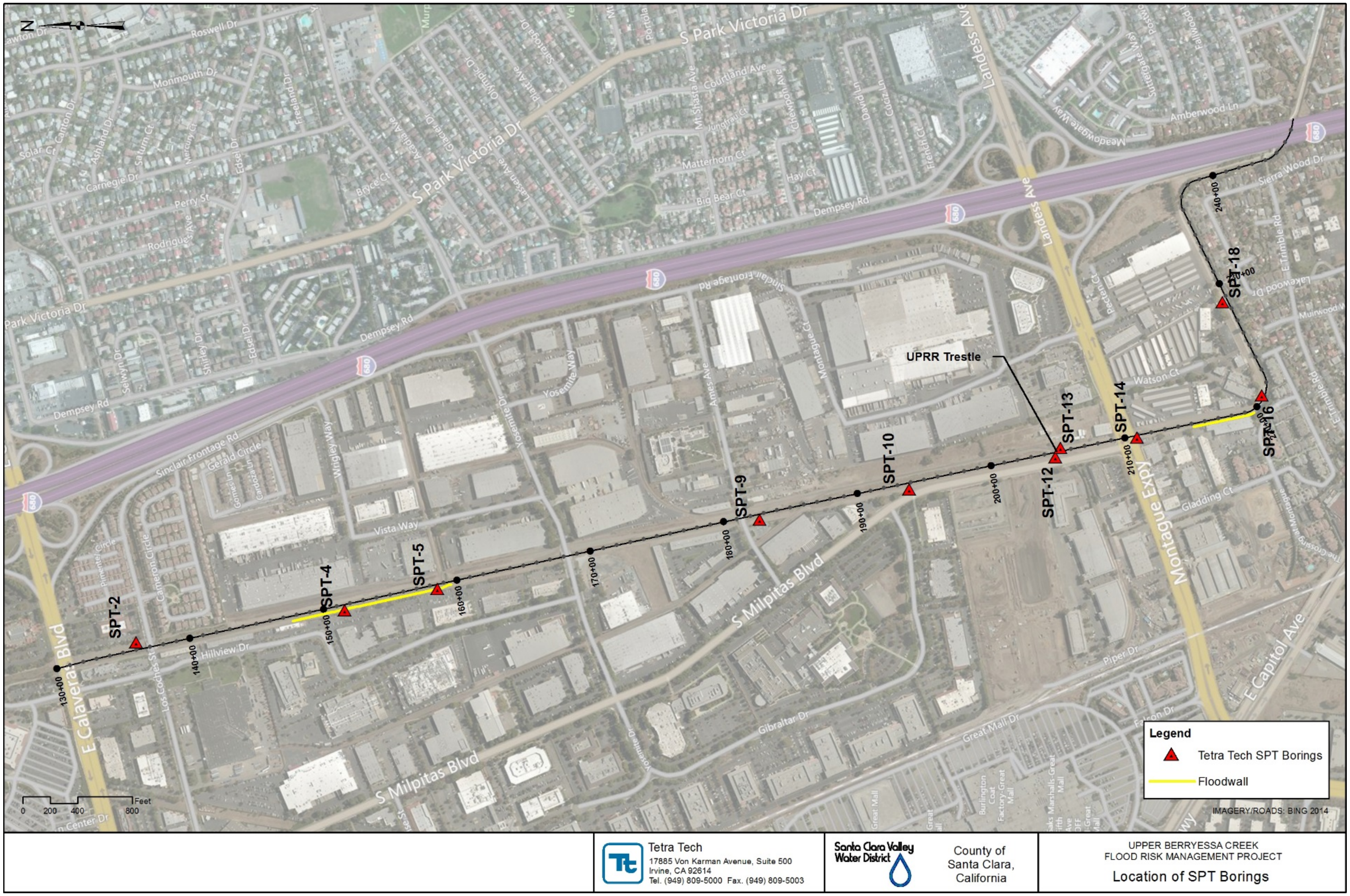

Figure 5. SPT Boring Locations

5. LABORATORY TESTING

Laboratory tests were performed on selected samples obtained from the borings in order to aid in the soil classification and to evaluate pertinent engineering properties of the foundation soils. The testing program was also developed to obtain the shear strengths required for the stability analyses and other geotechnical evaluations for the Project. Specifically, consolidated-undrained triaxial tests with pore pressure measurements were performed to determine "R" and "S" strengths required for the stability analyses in the Corps' engineering manual EM 1110-2-1902, Slope Stability. The following tests were performed for the Project:

- In-situ Moisture Content and Dry Density
- Grain Size Distribution
- Percent Passing #200 (silt and/or clay fraction)
- Atterberg Limits
- Unconfined Compression
- Direct Shear
- Consolidated-Undrained Triaxial with Pore Pressure Measurements
- Consolidation
- Expansion Index
- Water Soluble Sulfate Content

Testing was performed in general accordance with applicable ASTM Standards and California Test Methods. Results of all laboratory tests are presented in Attachment B. Selected laboratory results are also presented on the logs of the borings drilled for this exploration that are presented in Attachment A.

6. SUBSURFACE CONDITIONS

6.1. General

Based on the results of the historical borings, it was anticipated that the subsurface conditions were relatively consistent, with the soils generally being firm clays that contained irregular and discontinuous sand layers at various depths.

The CPT and SPT borings drilled for this project were located along the top of the existing bank. The top of the bank is relatively flat and roughly 8 to 10 feet above the channel bottom. The channel slopes are typically 2H:1V or flatter but some localized areas exhibits slopes steeper than 2H:1V.

Profiles of the subsurface conditions encountered by the historic CPT and SPT borings are shown on **Figure 6 and Figure 7**. The following sections present the significant results from each of the Phase I - CPT and Phase II - SPT explorations.

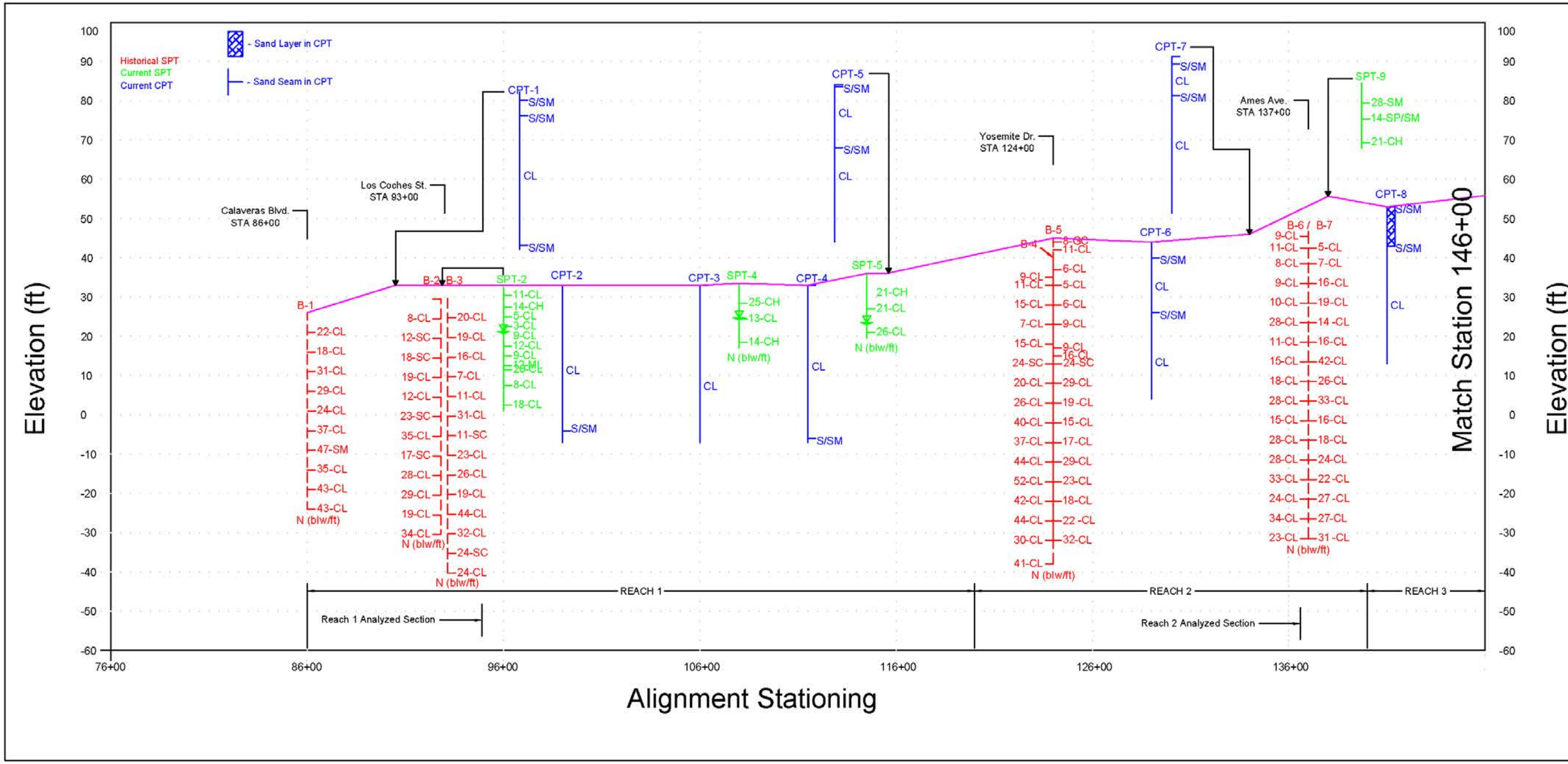

Figure 6. Soil Profile Along Alignment - Downstream

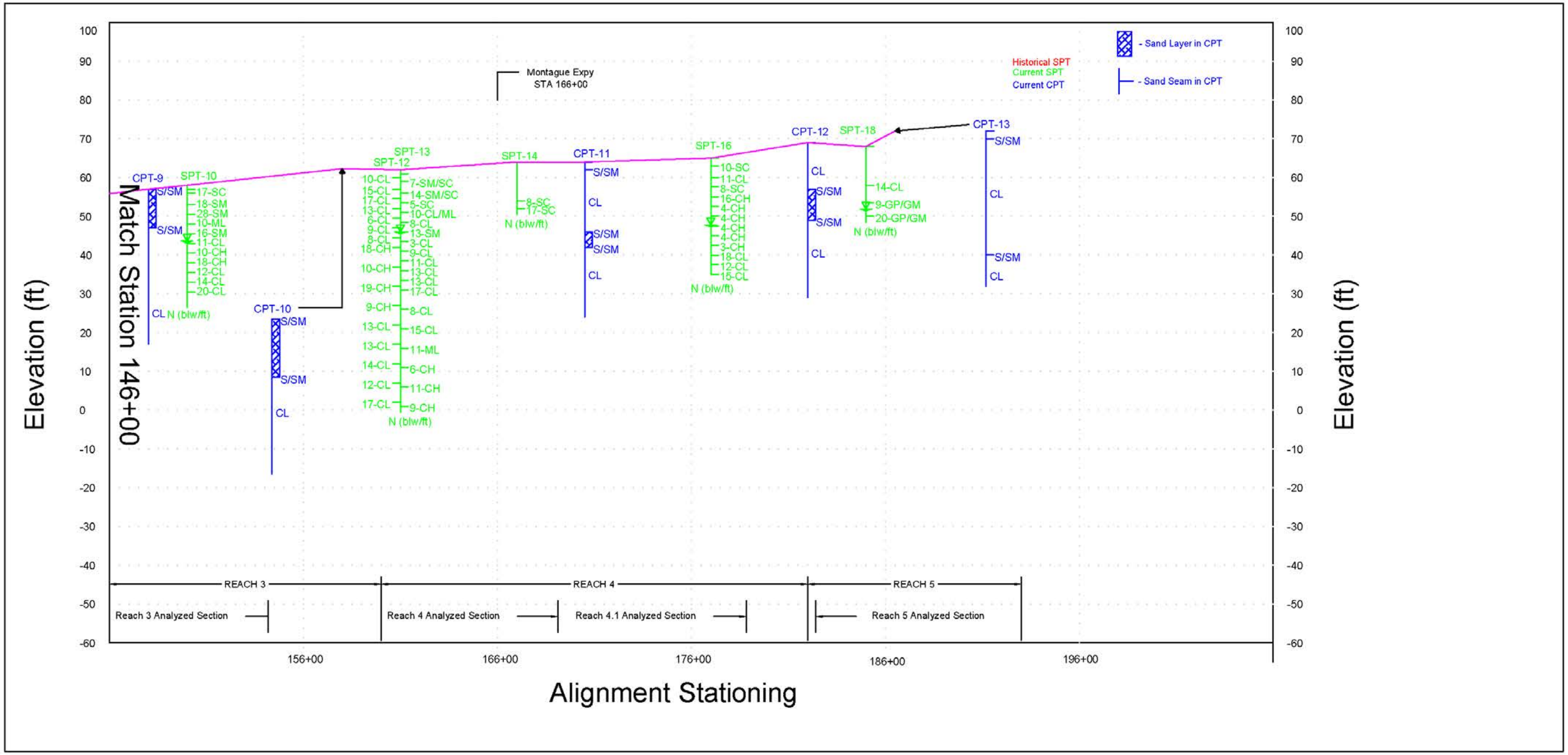

Figure 7. Soil Profile Along Alignment - Upstream

6.2. Phase I – CPT Exploration

As mentioned above, a total of 13 CPT borings were drilled for the Phase I exploration. The CPT borings were located at representative or critical locations to determine the subsurface conditions in the locations and depths where no historical data existed. All of the CPT borings were drilled to a depth of 40 feet.

The results of the CPT were essentially consistent with the results of the historical borings in that mostly cohesive soils were encountered. However, the total cone resistance (q_t) was very high in many of the clays, possibly indicating a significant amount of sand content.

Also, the Soil Behavior Types (SBT) for the CPT borings were also plotted. SBT charts use the basic CPT parameters of total cone resistance, q_t and friction ratio, R_f. The chart is global in nature and can provide reasonable predictions of soil behavior type for CPT soundings up to about 60 feet in depth. The SBT plots for the subsurface materials are presented on the CPT boring logs in Attachment A.

Because the CPT boring provides essentially a continuous profile of the subsurface conditions, the variability of the subsurface materials with depth are easily observed. As can be seen on the CPT boring logs, even the clays are variable with depth, ranging from sandy silts and clayey silts to clays and silty clays that alternate over short vertical distances. Zones of sand are readily apparent on the SBT plots on the CPT logs.

6.3. Phase II – SPT Exploration

While the CPT borings provided substantial information about the subsurface materials and conditions, no sampling was performed in the CPT borings. Therefore, 10 SPT borings were used to collect samples for laboratory testing, measure groundwater levels, and fill in any remaining data gaps in the subsurface information. The logs for the SPT borings are presented in Attachment A.

The subsurface conditions encountered in the exploratory borings generally consisted of shallow fills soils (af) overlying alluvial soils. The alluvium encountered in the borings were divided into two basic groups, younger alluvial deposits (Qa) associated with basin and younger alluvial fan deposits and older alluvial deposits (Qoa) associated with older alluvial fan deposits of the Upper Pleistocene and Holocene. Field classification between older and younger geologic units was primarily based on color and consistency of the soils observed.

Uncontrolled fill was encountered in all of the SPT borings at the ground surface to depths of 2 to 7 feet overlying natural soils. The uncontrolled fill consisted of silty sand or clayey sand in eight of the borings but consisted of clay soils in two of the borings. No documentation or records are available for this existing fill.

The natural soils beneath the uncontrolled fill typically consisted of firm cohesive soils with interbedded layers of sand to the depths of the borings. The cohesive soils were somewhat variable, ranging from clayey silts (CL-ML) to silty clays (CL) to high-plasticity clays (CH) that generally became stiffer with depth. The interbedded sands were generally silty sands and clayey sands.

The sand content of the cohesive soils also varied along the alignment. Some of the higher plasticity clays had 10 to 20 percent sand content while many of the silty clays had 35 to nearly 50 percent sand content. While the sand content in the silty clays was high, it is believed that there is sufficient fines contents in these deposits such that their behavior will be more cohesive in nature rather than granular.

Softer zones of clays were encountered in several of the borings although these layers were not thick and did not appear to be continuous. Many of these layers were encountered near the bottom of the existing channel invert elevation.

However, boring SPT-16 encountered 4 feet of clayey sand fill at the ground surface overlying stiff clay to a depth of 12 feet. Below the stiff clay, 13 feet of soft to medium stiff clay was encountered to a depth of 25 feet, where stiff clays were encountered to the depth of the boring. The N-values for the SPT samples in the soft to medium stiff layer were 4, although one sample exhibited an N-value of 3.

6.4. Groundwater Conditions

Historical high groundwater at the site was mapped by CDMG at depths between 7 and 12 feet (Figure 4, CDMG, 2001). Groundwater was encountered in many of the historical borings within the Project limits at depths varying from approximately 7 to 16 feet below existing grade. Further south along the alignment, near I-680, groundwater was encountered at a depth of 30 feet or more below existing grade (see **Table 1**).

In the 10 SPT borings drilled for the Phase II exploration, groundwater levels were encountered at depths of 8.8 to 17.2 feet, which is similar to the findings in the historic borings. **Table 2** presents the ground water measurements from the SPT borings.

Table 2. Groundwater Measurements in the SPT Borings

Boring	Depth to Groundwater During Drilling (ft.)	Depth to Groundwater At Completion of Drilling (ft.)
SPT-2	9.0	11.3 (15 min. AD[1])
SPT-4	10.2	8.8 (30 min. AD)
SPT-5	15.1	12.5 (30 min. AD)
SPT-9	None encountered	None encountered
SPT-10	18.0	14.4
SPT-12	17.5	14.8 (30 min. AD) 16.0 (60 min. AD)
SPT-13	20.0	16.7 (30 min. AD) 17.2 (60 min. AD)
SPT-14	None encountered	None encountered
SPT-16	15.5	17.2 (60 min. AD)
SPT-18	13.0	16.1

(1) AD – After Drilling complete.

This water was often contained in sand seams or other more permeable zones. However, as can be seen in the table, in two of the borings (SPT-9 and SPT-14) no water was encountered in the borings at the completion of drilling. In boring SPT-18, a wet gravel layer was encountered at a depth of 13.0 feet that extended to the depth of the boring at 19.5 feet.

Caving was noted only in the deep SPT borings drilled for the culvert and it occurred in these two borings at depths greater than 50 feet. In the remaining borings, no caving of the bore hole was reported, indicating the relatively cohesive nature of the subsurface materials and relatively high fines content of the sands on the Project. Even the gravel encountered in boring SPT-18 had sufficient fines and cohesion to stay open after the augers were removed the bore hole.

A comparison of the currently measured depths to groundwater and levels measured during previous exploration indicates that significant fluctuations in local groundwater can occur over time and across relatively short distances. For instance, the 1982 groundwater measurements from borings near the proposed UPRR culvert location were made in April and likely reflect typical water levels at the end of the winter season. The current groundwater measurements in that area were made in December, at the beginning of the winter rainy season. It must be noted as well that all the borings were located within the top of the channel bank, and likely a horizontal distance of at least 25 feet away from invert of the channel. Construction work for the proposed culvert will require excavation within and beneath the existing channel bottom. It should be anticipated that this work will encounter groundwater.

7. ENGINEERING SEISMOLOGY

7.1. General Seismic Setting

The Northern California region is known to be seismically active. Earthquakes occurring within approximately 60 miles of the site are generally capable of generating ground shaking of engineering significance to the proposed construction. The project area is located in the general proximity of several active and potentially active faults, as shown on **Figure 8**. Active faults are defined as those that have experienced surface displacement within the Holocene period (approximately the last 11,000 years). The closest active faults to the site are the Hayward Fault, located approximately 1.1 mile to the northeast, and the Calaveras-Pacines-San Benito Fault (Hayward Fault), is located approximately 4.2 miles to the east. The Calveras and Hayward Fault splay apart south of the Project site and become two distinct fault features. Other nearby faults include the Monte Vista/East Fault and San Andreas Fault, located approximately 11 miles and 15.5 miles to the southwest, respectively.

Figure 9 – Regional Historical Seismicity Map, shows the location of significant faults along with the locations of historic earthquakes with magnitudes of 5 or greater. Of these, notable historic earthquakes in Southern California of significance to the Project are included in **Table 3**.

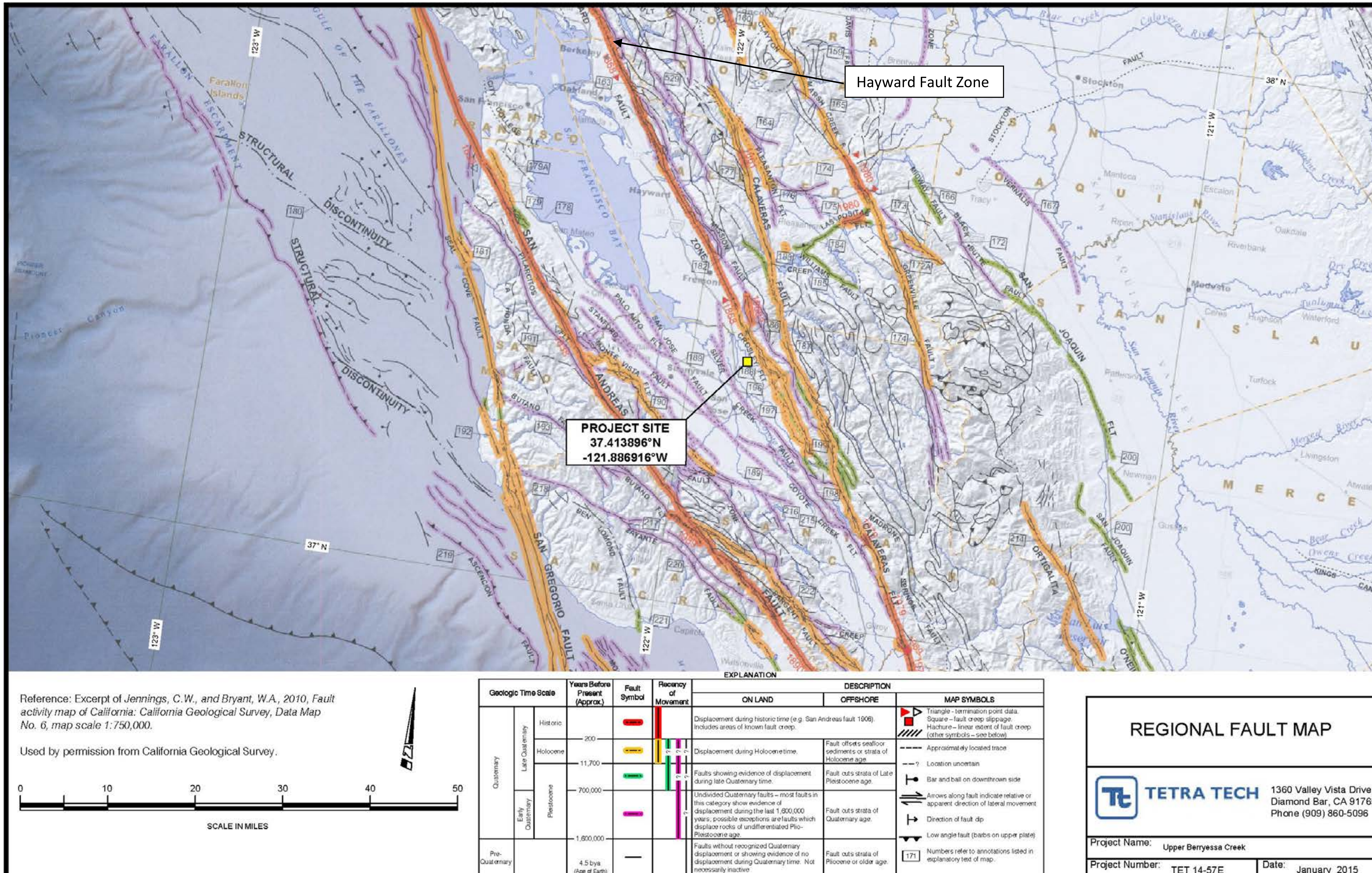

Figure 8. Regional Fault Map

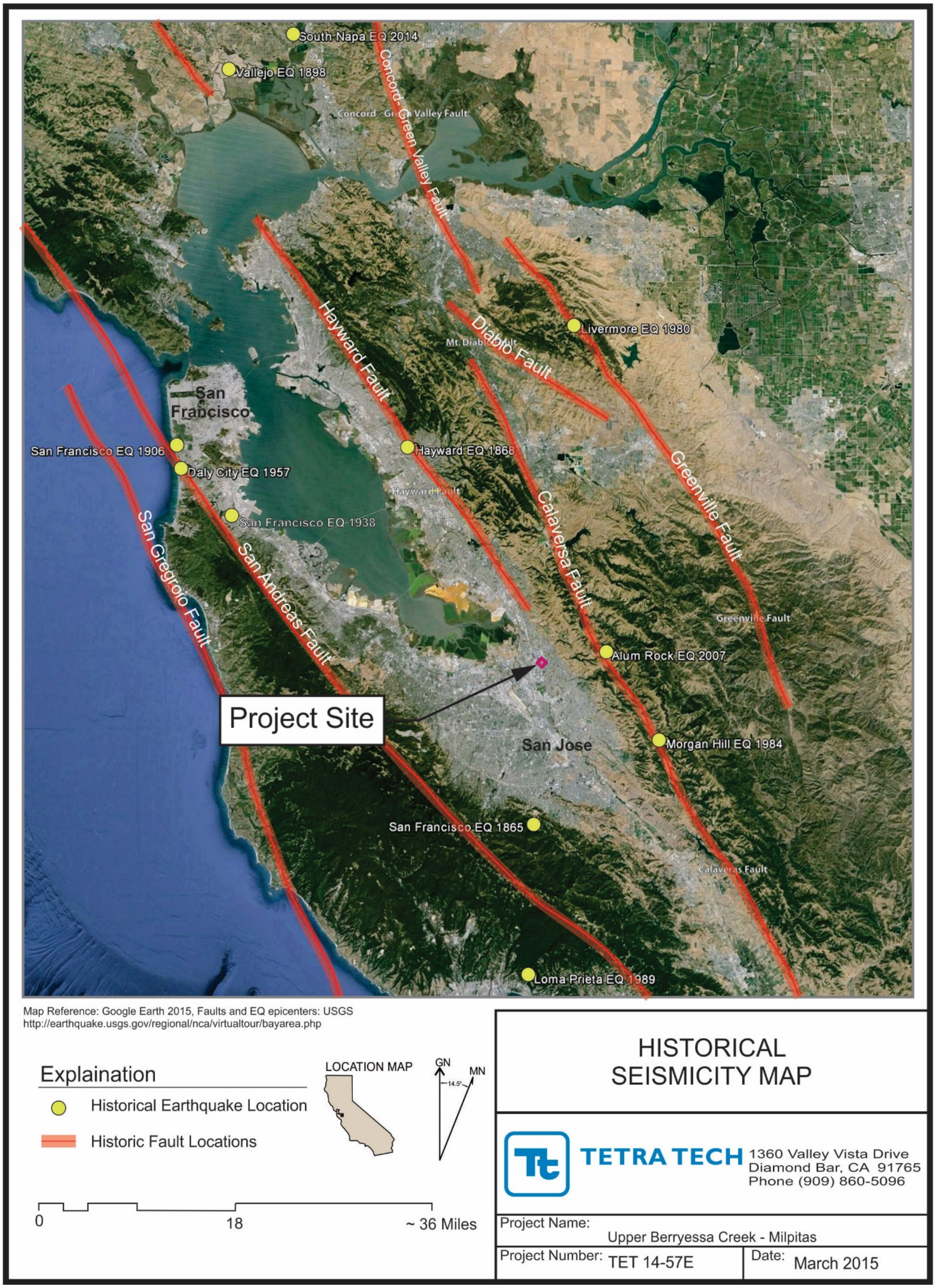

Figure 9. Historical Seismicity Map

Table 3. Significant Historical Earthquakes

Year	Date	Location	Mag.	Approximate Epicenter Location	Fault Name	Distance from Site (miles)
2014	24-Aug	American Canyon	6.0	38.21°N, -122.32°W	2014 South Napa earthquake	59.9 N
2007	30-Oct	Alum Rock	5.6	37.43°N, -121.77°W	2007 Alum Rock earthquake	6.5 S
1989	17-Oct	Santa Cruz Mountains	6.9	37.00°N, -121.90°W	**1989 Loma Prieta earthquake**	28.8 S
1984	24-Apr	Morgan Hill	6.2	37.31°N -121.68°W	1984 Morgan Hill earthquake	13.5 SE
1980	24-Jan	Livermore	5.8	37.86°N, -121.82°W	1980 Livermore earthquake	30.9 N
1957	22-Mar	Daly City	5.3	37.67°N, -122.48°W	1957 Daly City earthquake	36.9 NW
1911	1-Jul	Coyote	6.6	37.25°N, -121.75°W	1911 Calaveras earthquake	13.9 S
1906	18-Apr	San Francisco	7.8	37.70°N, -122.51°W	**1906 San Francisco earthquake**	39.1 NW
1898	31-Mar	Mare Island	6.2	38.20°N, -122.41°W	1898 Vallejo	59.7 N
1868	21-Oct	Hayward	6.8	37.70°N, -122.10°W	1868 Hayward earthquake	22.6 N
1865	8-Oct	Santa Cruz Mountains	6.3	37.20°N, -121.92°W	1865 San Francisco earthquake	15.3 S
1838	June	San Francisco Peninsula	7.0	37.60°N, -122.40°W	1838 San Francisco earthquake	30.6 NW

Based on the data above, the most notable historic earthquakes occurred in 1906 (San Francisco earthquake) and 1989 (Loma Prieta earthquake).

7.2. Seismic Hazards

The engineering seismology study for the site included reviewing local and regional fault maps and the review of historical earthquake data. Specifically, the following engineering seismology issues were addressed:

<u>Seismic Hazard Zones</u>: Maps of seismic hazard zones are issued by the California Geological Survey (CGS, formerly California Department of Conservation, Division of Mines and Geology (CDMG)) in accordance with the Seismic Hazards Mapping Act enacted in April 1997. The intent of the Seismic Hazards Mapping Act is to provide for a statewide seismic hazard mapping and technical advisory program to assist cities and counties in developing compliance requirements to protect the public health and safety from the effects of strong ground shaking, liquefaction, landslides, or other ground failure and other seismic hazards caused by earthquakes.

Based on the review of the Milpitas Quadrangle Official Map of Seismic Hazard Zones issued October 19, 2004 (**Figure 10**), the Project is located within an area identified by the State of California as subject to the hazard of liquefaction but is not located in an area subject to earthquake-induced landslides.

Surface Fault Rupture: Official Maps of Earthquake Fault Zones were reviewed to evaluate the location of the Project relative to active fault zones. Earthquake Fault Zones (known as Special Studies Zones prior to 1994) have been established in accordance with the Alquist-Priolo Special Studies Zones Act enacted in 1972. The Act directs the State Geologist to delineate the regulatory zones that encompass surface traces of active faults that have a potential for future surface fault rupture. The purpose of the Alquist-Priolo Act is to regulate development near active faults in order to mitigate the hazard of surface fault rupture.

The site is not located within a designated Alquist-Priolo Earthquake Fault Zone for fault surface rupture hazard. No surface traces of any active or potentially active faults are known to pass directly through or project towards the site. Neither our field exploration nor literature review disclosed an active fault trace in the Project area. Therefore, the potential for surface rupture due to faulting occurring beneath the site during the design life of the proposed development is considered low. Based on a review of State of California Earthquake Fault Zone maps, the closest fault is located approximately 2 km (CDMG, 1991) to the northeast of the Project.

7.3. Seismic Demand

The seismic demand at the site was evaluated based upon a probabilistic seismic hazard analyses approach. The evaluation utilized the USGS Probabilistic Seismic Hazard Deaggregation website https://geohazards.usgs.gov/deaggint/2008/ as a tool to calculate probabilistic peak ground acceleration. The attenuation relationships used for ground motion prediction include the Next Generation Attenuation (NGA) relationships of Boore and Atkinson (2008), Campbell and Bozorgnia (2008), and Chiou and Youngs (2008). An assumed average shear wave velocity in the top 30 meters (Vs_{30}) of 270 meters per second was used in the model. The peak ground accelerations for various year return periods were estimated from the USGS website. USACE criteria for design of structures require various return period values for Operating Basis Earthquake (OBE) and Maximum Design Earthquake (MDE). A summary of the estimated peak ground acceleration values for various return periods are presented in **Table 4**. A printout of the seismic demand analysis is included in this report as Attachment C.

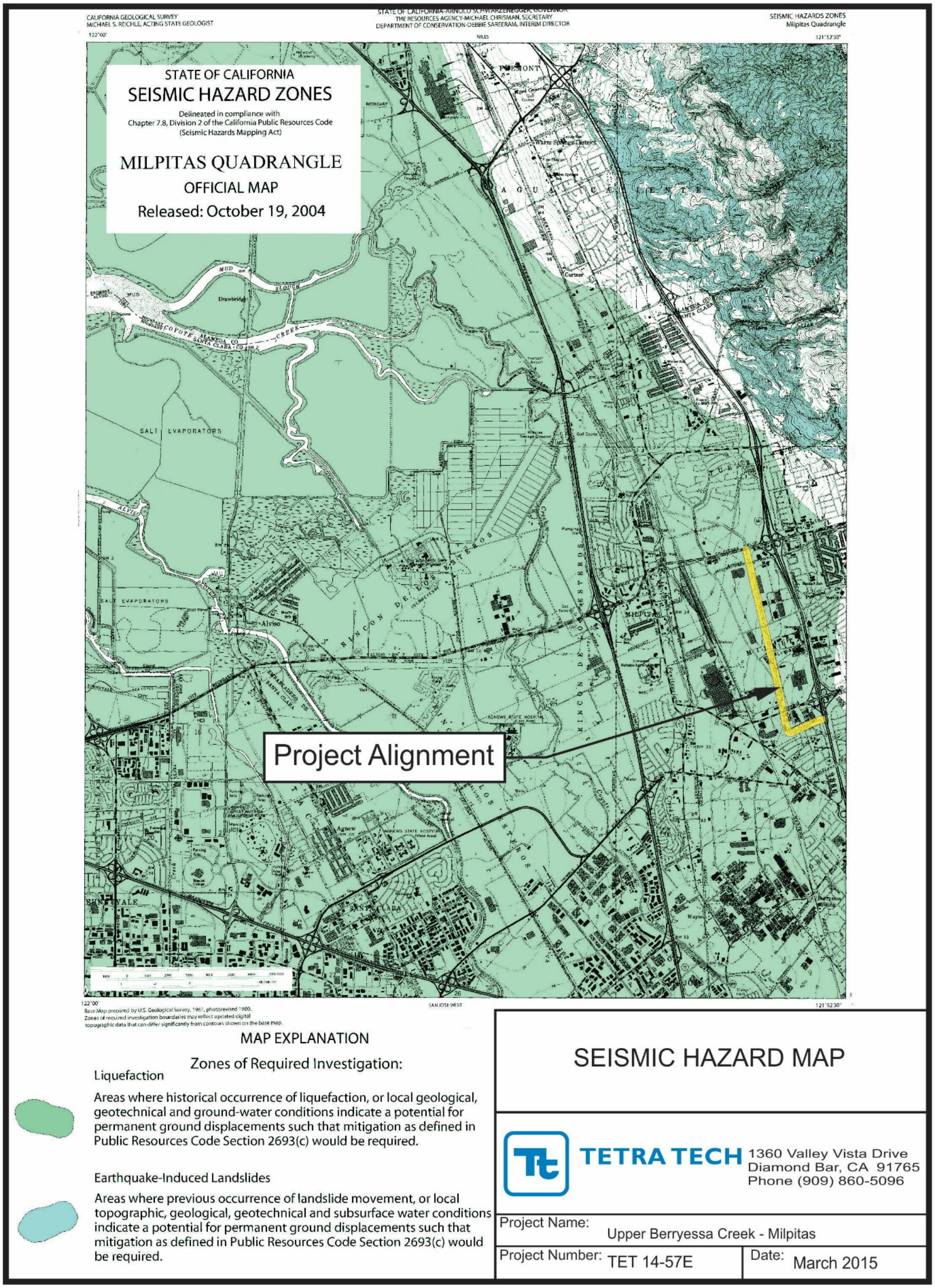

Figure 10. Seismic Hazard Map

Table 4. Estimated Peak Ground and Spectral Accelerations

Return Period	Peak Ground Acceleration	Spectral Acceleration		
		0.2 second	0.3 second	1 second
108 years	0.36g	0.77g	0.75g	0.43g
144 years	0.41g	0.87g	0.86g	0.50g
475 years	0.63g	1.35g	1.35g	0.82g
949 years	0.76g	1.64g	1.66g	1.04g

Seismic parameters for the Maximum Considered Earthquake (MCE) were estimated using the USGS website (**http://earthquake.usgs.gov/designmaps/us/application.php**). The MCE values estimated by this website are the lesser of values based on a probabilistic analysis utilizing a 2,475 year return period (2% probability of exceedance in 50 years) and maximum values based on a deterministic analysis of nearby characteristic faults. This procedure yielded design spectral acceleration values of 1.24g for 0.2 and 0.3 second, and 0.75g for 1.0 second. A printout of the MCE analysis is included in Attachment C.

7.4. Liquefaction Potential and Dynamic Settlement

Liquefaction of soils can be caused by ground shaking during earthquakes. Research and historical data indicate that loose, relatively clean granular soils are susceptible to liquefaction and dynamic settlement. Liquefaction is generally known to occur in saturated or near-saturated, cohesionless soils at depths shallower than about 50 feet. Most clayey silts, silty clays and clays are not typically adversely affected by ground shaking, however, fine-grained soils with high sensitivity (low remolded strength versus peak strength) can be susceptible to liquefaction.

7.5. Potential Liquefiable Soils

Evaluation of liquefaction potential for the sandy soils was performed based on the soil stratigraphy encountered in Boring SPT-12, and CPT sounding CPT-5, CPT-6, and CPT-8 through CPT-12. Potentially liquefiable soils consisted of relatively thin layers of loose to medium dense sandy soils encountered at various depths shown in the boring and CPT logs. In addition, fine-grained soils were evaluated with regard to strength sensitivity and susceptibility to liquefaction.

7.6. Groundwater Level

Historical high groundwater at the site was mapped by CDMG (**Figure 11**) at depths of about 7 to 12 feet (CDMG, 2001). Parikh (2004) reported groundwater depths as shallow as 7.5 below the existing channel bank. For the current field exploration, groundwater shortly after the completion of drilling was encountered at depths of approximately 9 to 17 feet below the channel bank. In this study, a groundwater depth of 7 to 10 feet was assumed

for evaluation of liquefaction potential of the on-site materials, depending on the boring/CPT location.

7.7. Evaluation of Liquefaction Potential

The liquefaction potential of cohesionless (sandy) soils was evaluated based on the field exploration and laboratory test results utilizing procedure published in Youd and Idriss (2001) consensus publication on liquefaction evaluation, and as recommended in the CDMG Special Publication 117 (CDMG, 2008).

The analyses based on standard penetration test (SPT) blow-counts (N) considered the energy ratio correction factor C_E of 1.3 to estimate corrected blow-count values (N_{60}). This ratio is based on Table 5.2 of the Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Liquefaction in California (SCEC, 1999). For an automatic trip hammer the table suggests the energy ratio correction factor range from 0.9 to 1.6 (modified from Youd and Idriss, 1997). Consequently, the selected design energy ratio correction factor of 1.3 is an average and reflects a hammer efficiency of approximately 78 percent, which is consistent with our experience with similar equipment. The blowcounts recorded for soils driven with the 3-inch O.D. California Sampler with brass rings were converted to an equivalent SPT blowcounts using a reduction factor of 0.65 to account for the larger sampler diameter size. Borehole diameter correction factor C_B of 1 based on the internal diameter of the hollow stem auger system used for the drilling was utilized in our liquefaction evaluation. Where CPT data was utilized, equivalent N_{60} values were estimated based on Lunne et al (1997).

Results of liquefaction analyses of granular soils are summarized in **Tables 5 and 6** in the next section and presented in Attachment D. The analyses indicated that the loose to medium silty fine sands encountered at various depths are susceptible to liquefaction.

Liquefaction and cyclic softening potential of fine-grained soils were evaluated based on moisture content and other index properties of the soils. The fine-grained soils are classified in the following three categories:

1. Soils with Plasticity Index < 12 and moisture content greater than 85 percent of the liquid limit are classified as fine-grained soils susceptible to liquefaction (typically silts).

2. Soils with Plasticity Index > 18 are classified as fine-grained soils potentially susceptible to significant loss of strength during seismic shaking and require additional evaluation. The sensitivity of the on-site fine-grained soils was then evaluated based on the water content, Atterberg limits, and effective vertical stresses using the procedures suggested by Holtz and Kovacs (1981) and Mitchell and Soga (2005).

3. Fine-grained soils falling outside the two categories above are considered to behave like clays and are not considered susceptible to liquefaction.

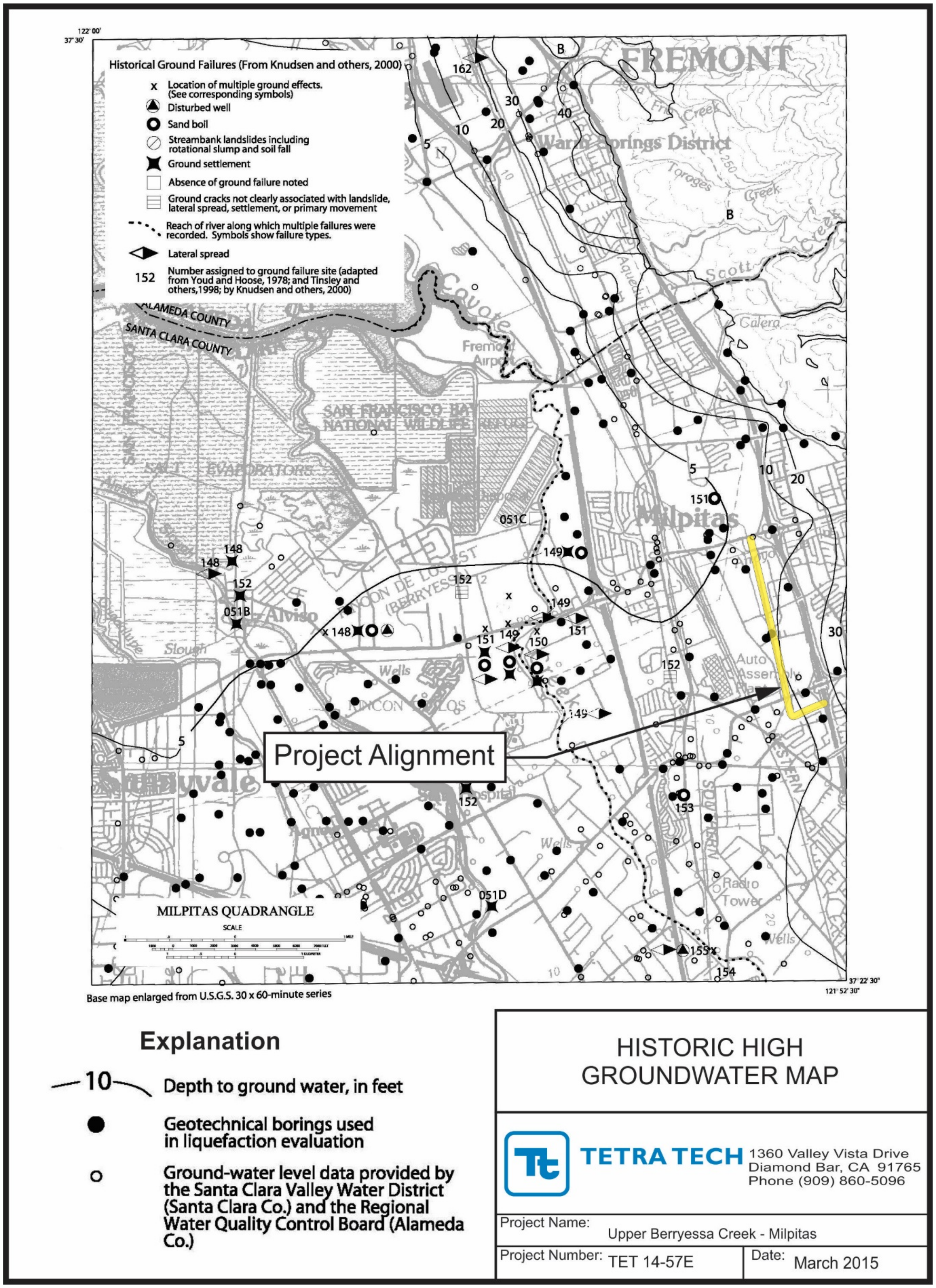

Figure 11. Historic High Groundwater Map

The plasticity index of the on-site clayey soils generally ranges from 15 to 52. Sensitivity analyses were performed for the on-site fine-grained soils with a plasticity index greater 18. Analyses of the sensitivity of the on-site clayey soils indicated low sensitivity with an estimated sensitivity index generally ranging from 1 to 4. Consequently, the potential for significant loss of strength of the on-site clayey soils and ensuing seismic deformation during seismic shaking is considered low. Results of sensitivity analyses for the on-site clayey soils are included in Attachment D.

7.8. Dynamic Settlement

Seismic settlement can occur in both dry and saturated sands when loose to medium-dense granular soils undergo volumetric changes during ground shaking. Seismic settlement can occur in saturated sands due to liquefaction or in dry sands due to densification of the soil matrix. The potential for seismic settlement due to liquefaction was calculated according to the procedures presented by Tokimatsu and Seed (1987). The potential for dry seismic settlement was calculated according to the procedures presented by Pradel (1998). **Tables 5 and 6** present the results of liquefaction analyses and dynamic settlement:

Table 5. Results of Liquefaction Analyses (108-year return period earthquake)

Boring No.	Assumed Groundwater Depth	Liquefiable Zone Depth	FS_{liq}	Liquefaction Settlement	Settlement of Dry Sands	Combined Dynamic Settlement
	(ft)	(ft)	–	(inch)	(inch)	(in)
SPT-12	10	14 to 16	0.9	0.5	0.1	0.6
CPT-5	7	Non - liquefiable	>1.3	--	--	--
CPT-6	7	Non - liquefiable	>1.3	--	--	--
CPT-8	10	Non - liquefiable	>1.3	--	--	--
CPT-9	10	Non - liquefiable	>1.3	--	--	--
CPT-10	10	Non - liquefiable	>1.3	--	--	--
CPT-11	10	Non - liquefiable	>1.3	--	--	--
CPT-12	10	Non - liquefiable	>1.3	--	--	--

Table 6. Results of Liquefaction Analyses (475-year return period earthquake)

Boring No.	Assumed Groundwater Depth	Liquefiable Zone Depth	FS_{liq}	Liquefaction Settlement	Settlement of Dry Sands	Combined Dynamic Settlement
	(ft)	(ft)	–	(inch)	(inch)	(in)
SPT-12	10	14 - 16	0.5	0.5	0.4	0.9
CPT-5	7	14 - 16	0.6 – 1.0	0.3	0.1	0.4
CPT-6	7	18 - 19	0.5 – 1.2	0.2	0.1	0.3
CPT-8	10	13 – 14, 27.5 - 29	0.5 – 1.0	0.6	0.1	0.7
CPT-9	10	10 - 11	0.5 – 0.6	0.5	0.1	0.6
CPT-10	10	10 - 14	0.9 – 1.3	0.4	0.0	0.4
CPT-11	10	17 – 20, 36 - 38	0.3 – 1.0	0.5	0.1	0.6
CPT-12	10	19 – 20.5	0.4 – 1.1	0.2	0.1	0.3

As shown in **Tables 5 and 6** above, the combined dynamic settlement was estimated to be less than 1 inch. Given the magnitude of the dynamic settlement and the thinness of the potentially liquefiable layers encountered in the exploration borings and CPTs, it is our opinion that liquefaction is not a geotechnical concern, and potential dynamic settlement at the site will not adversely impact the proposed improvements. The results of dynamic settlement analyses are presented in Attachment D.

8. ANALYSES OF CHANNEL IMPROVEMENTS

8.1. General

As mentioned previously, the channel improvements will be designed to provide protection against a 100-year level flood event. The improvements consist of regrading and widening the existing channel, installing slope protection on the channel slopes, and using short floodwalls less than 2 feet high in two areas (see Figure 3 for the location of the floodwalls). The following sections present the results of the analyses and evaluations for the proposed channel cross-sections.

8.2. Hydrologic and Hydraulic Evaluations

To determine the 100-year flood levels, the latest Hydrologic and Hydraulic model was used. The 100-year water surface profile from this model was used to determine at the 100-year flood level at the individual analyses locations. Based on a review of the hydrograph for the 100-year event, it appears that the duration of the higher water levels is relatively

brief, only remaining high for less than four hours. It is understood that the hydrologic and hydraulic model and results have been submitted separately.

8.3. Channel Geometry

The channel will be deepened slightly and the slopes will be graded to a consistent 2H:1V slope and a constant 20-foot bottom width. Erosion protection will be placed on the channel slopes. It is anticipated that the erosion protection will consist of geocells filled with aggregate or concrete and stabilized with stakes installed into the subgrade. Details of the erosion protection can be found in the 60% design drawings. A typical cross-section of the proposed channel from the 60% design drawings is shown in **Figure 12**.

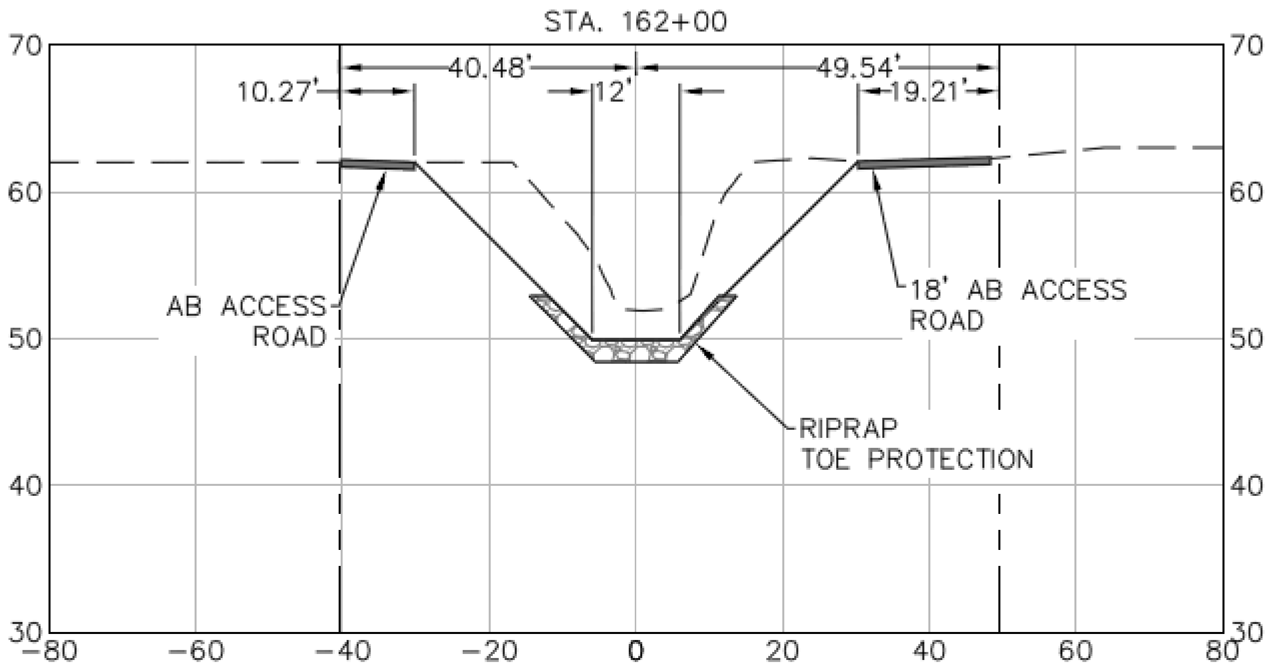

Figure 12. Typical Proposed Channel Cross-Section

8.4. Geotechnical Analyses

8.4.1. General

The geotechnical evaluations for the channel improvements consisted of slope stability analyses of the proposed side slopes using the results of the subsurface explorations and laboratory testing. The initial step in the evaluations was to review the results of the borings and laboratory testing and to divide the Project into reaches. A single cross-section was then analyzed for stability that would be representative for the entire reach. The most critical subsurface conditions encountered in the reach were used in the evaluations. Discussion of the reach determinations, shear strength determinations, and stability analyses are presented in the following sections.

8.4.2. Reach Determinations

Based on a review of the historic borings and the results of the Phase I CPT and Phase II SPT explorations, the channel was divided into reaches such that the conditions within each reach were relatively consistent and could be modeled using a single cross-section.

A total of six reaches were determined. The locations of the reaches and the analyzed cross-sections within each reach are shown on **Figures 6 and 7**. The floodwalls in Reaches 1 and 4 were not included in the stability analyses of the channel slopes but are discussed separately later in this report.

The individual reaches and the CPT and SPT borings considered for the reaches are shown in **Table 7** and discussed in more detail in the following paragraphs.

Table 7. Reach CPT/SPT and Station Limits

Reach No.	Station Limits	CPT/SPT
Reach 1	86+00 - 120+00	CPT-1, CPT-2, CPT-3, CPT-4, CPT-5, SPT-2, SPT-4, SPT-5
Reach 2	120+00 - 140+00	CPT-6, CPT-7, SPT-9
Reach 3	140+00 - 160+00	CPT-8, CPT-9, CPT-10, SPT-10, SPT-12, SPT-13
Reach 4	160+00 - 182+00	CPT-11, CPT-12, CPT-13, SPT-14
Reach 4.1	177+00	SPT-16
Reach 5	182+00 - 193+00	SPT-18

Reach 1 lies between Stations 86+00 and 120+00. Top of bank elevations in Reach 1 vary between approximately 33.0 and 40.0 feet. A sandy silt to silty clay layer tends to be present within the first 10.0 to 15.0 feet of Reach 1 soil profile. This initial layer is typically followed by a clay layer roughly 15.0 feet thick, which is then underlain by a slightly stronger clay layer to a depth of 40.0 feet.

Reach 2 lies between Stations 120+00 and 140+00, and the top of bank elevations range from elevation 40.0 to 53.0 feet. Typically, the soil profile in Reach 2 begins with a silty clay layer to approximately elevation 35.0 feet. A second layer of weaker clay is then encountered that ranged from 15.0 to 17.0 feet thick overlying a slightly stronger layer of clay and silty clay.

Reach 3 extends from station 140+00 to station 160+00, and the top of bank elevation ranges from elevation 53.0 to 61.0 feet. Reach 3 is distinguished due to a thick silty sand and sandy silt layer that typically extends to depths of 10 to 15 feet below the top of the bank. The initial layer is followed by a clay layer to elevation 21.0 feet. The final layer is a thin silty clay layer extending to elevation 13.0 feet.

Reach 4 extend from station 160+00 to station 182+00, and straddles the Montague Expressway. The top of bank elevation ranges from 61.0 to 65.0 feet. A stiff silty clay layer is usually encountered first, down to elevation 55.0 feet. This first layer is typically followed by a sandy clay layer that extends to elevation 33.0 feet, and is followed by a significantly stronger silty clay to sandy clay layer down to elevation 25.0 feet.

However, boring SPT-16 was within Reach 4 at the outside bend of the channel (Station 177+00) and this boring encountered much different conditions than the closest upstream and downstream borings. Boring SPT-16 encountered 4 feet of clayey sand fill at the ground surface overlying stiff clay to a depth of 12 feet. Below the stiff clay, 13 feet of soft to medium stiff clay were encountered to a depth of 25 feet. Because these soft to medium stiff clays could adversely impact the stability of the proposed slopes and because of its critical location at the outside bend of the channel, it was decided to analyze this section location. This analyzed section was designated as Reach 4.1.

Reach 5 extend from station 182+00 to station 193+00, and the top of bank elevation ranges from elevations 65.0 to 75.0 feet. An increasingly stiff clay and silty clay layer follows the first sand layer and extend to elevation 47.0 feet. The final layer is moderately stiff clay that typically extend down to elevation 30.0 feet.

8.4.3. Shear Strength Selections

8.4.3.1 Undrained Shear Strengths. To determine the undrained strengths of the cohesive soils on the Project, SPT N-values, CPT relationships, and the results of the laboratory tests were all considered. However because the CPT testing provides a nearly continuous determination of the undrained strength of the soil with depth, the CPT data was evaluated first, then compared with the SPT and testing information.

For the CPT boring results, the undrained shear strength, s_u (Q-strength) is estimated with the following relationship:

$$s_u = \frac{q_t - \sigma}{N_{kt}}$$

where: s_u = undrained shear strength (psf)
q_t = total cone resistance (psf)
σ = overburden pressure (psf)

N_{kt} = dimensionless factor (10 to 18 but often 14 to 16)

Initially, the undrained shear strengths from the CPT borings were calculated using an N_{kt} value of 16. The results of the undrained shear strength determinations were then compared to the unconfined compression test results performed on two samples of the clays at the Project. However, these two unconfined compression tests indicated undrained shear strengths of 623 and 721 psf which were significantly less than the undrained strengths calculated for the CPT borings near these test locations. As a result, the undrained shear strengths from the CPT borings were recalculated using an N_{kt} value of 18.

For each reach, the undrained shear strengths from each CPT boring within that reach were plotted. The selected undrained strength was then conservatively selected based on an inspection of the plots for each reach. These plots of the undrained shear strengths from the CPT borings, unconfined compression tests, and our selected undrained strengths (Q-strengths) for the various clay layers in the five reaches are shown in **Figures 13 through 17**.

For the cohesionless sands on the Project, the undrained strengths were assumed to be equal to the drained strengths. The drained strength determinations for the cohesionless sands are discussed in detail in the next section of the report.

The clayey sands on the Project generally contained an appreciable amount of fines. It is believed that these cohesive sands will behave more similarly to cohesive soils rather than cohesionless soils. Therefore, to be conservative, the undrained strengths for the clays on the Project were also assigned to the clayey sands.

For boring SPT-16, the undrained shear strengths for the clays were determined using the SPT N-values in accordance with the procedures outlined in Bowles (Bowles, 1997). The upper clay was assigned a cohesion value of 1,164 psf, the soft to medium stiff clays a cohesion value of 380 psf and a cohesion value of 1,430 psf was determined for the underlying stiff clays. These calculations are presented in Attachment E. We would note that a shear strength test was assigned to a sample of the soft to medium stiff clay in this boring but the result of the test was very questionable and could not be used.

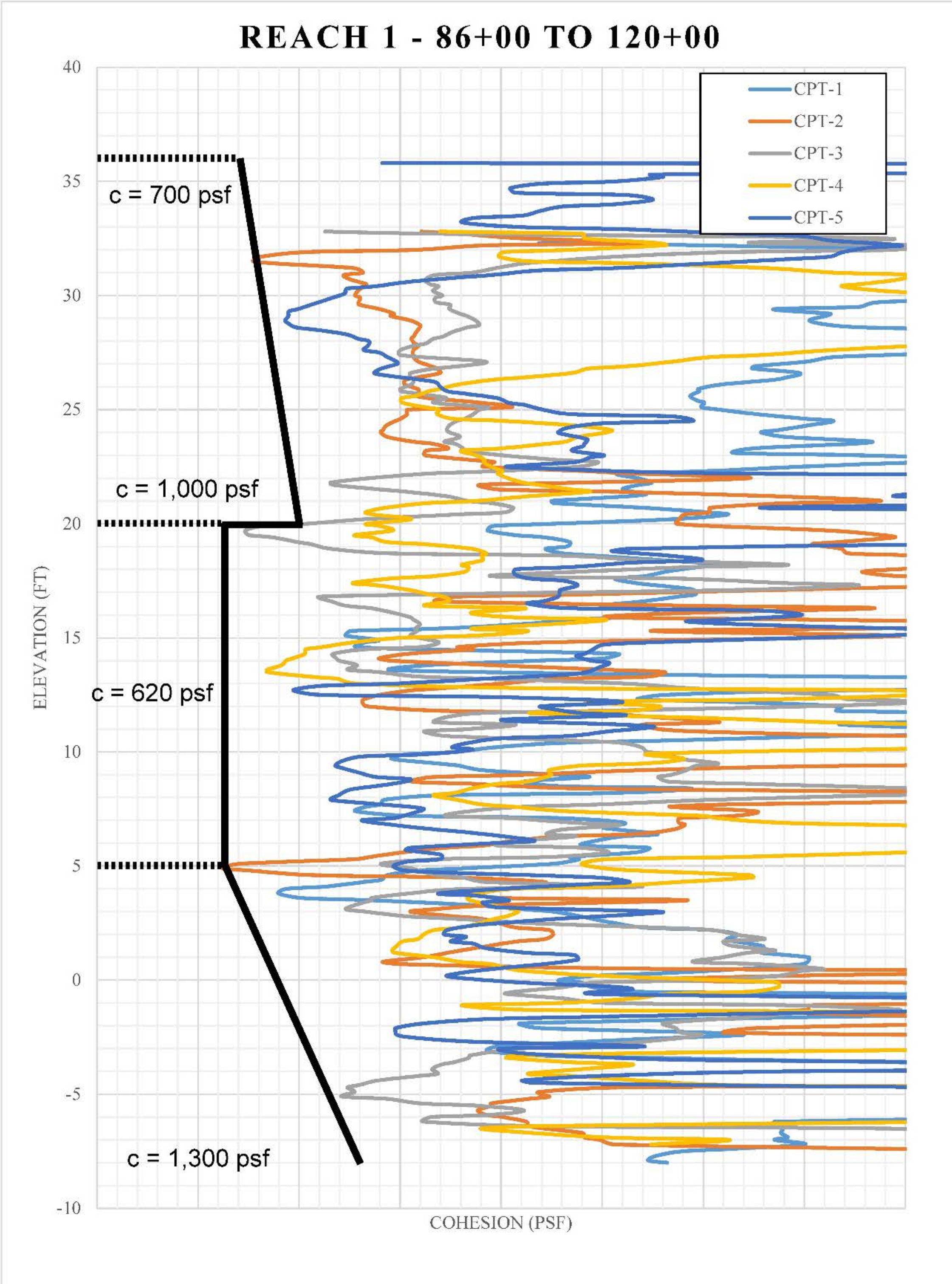

Figure 13. Reach 1 CPT Results and Selected Undrained Strengths

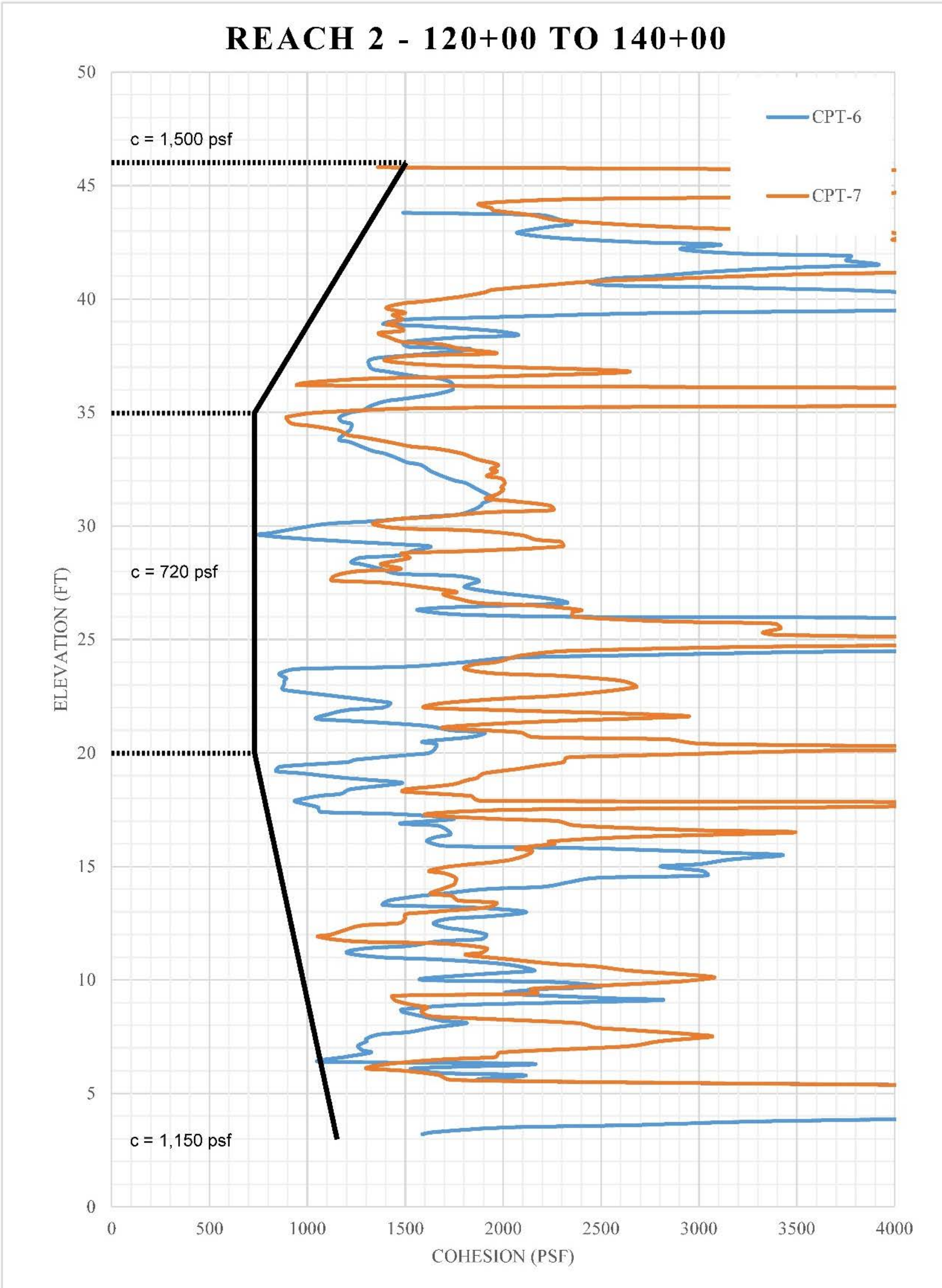

Figure 14. Reach 2 CPT Results and Selected Undrained Strengths

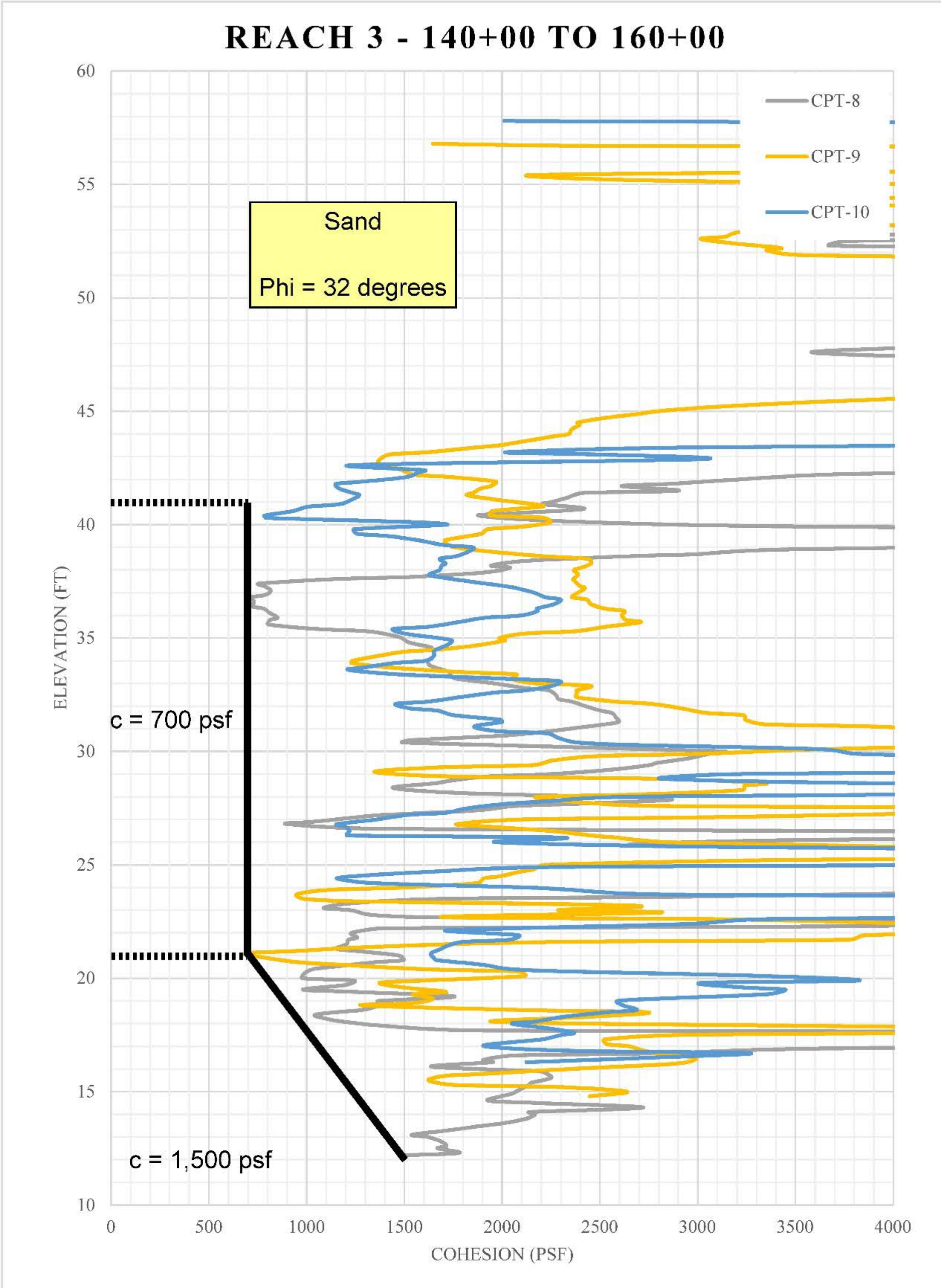

Figure 15. Reach 3 CPT Results and Selected Undrained Strengths

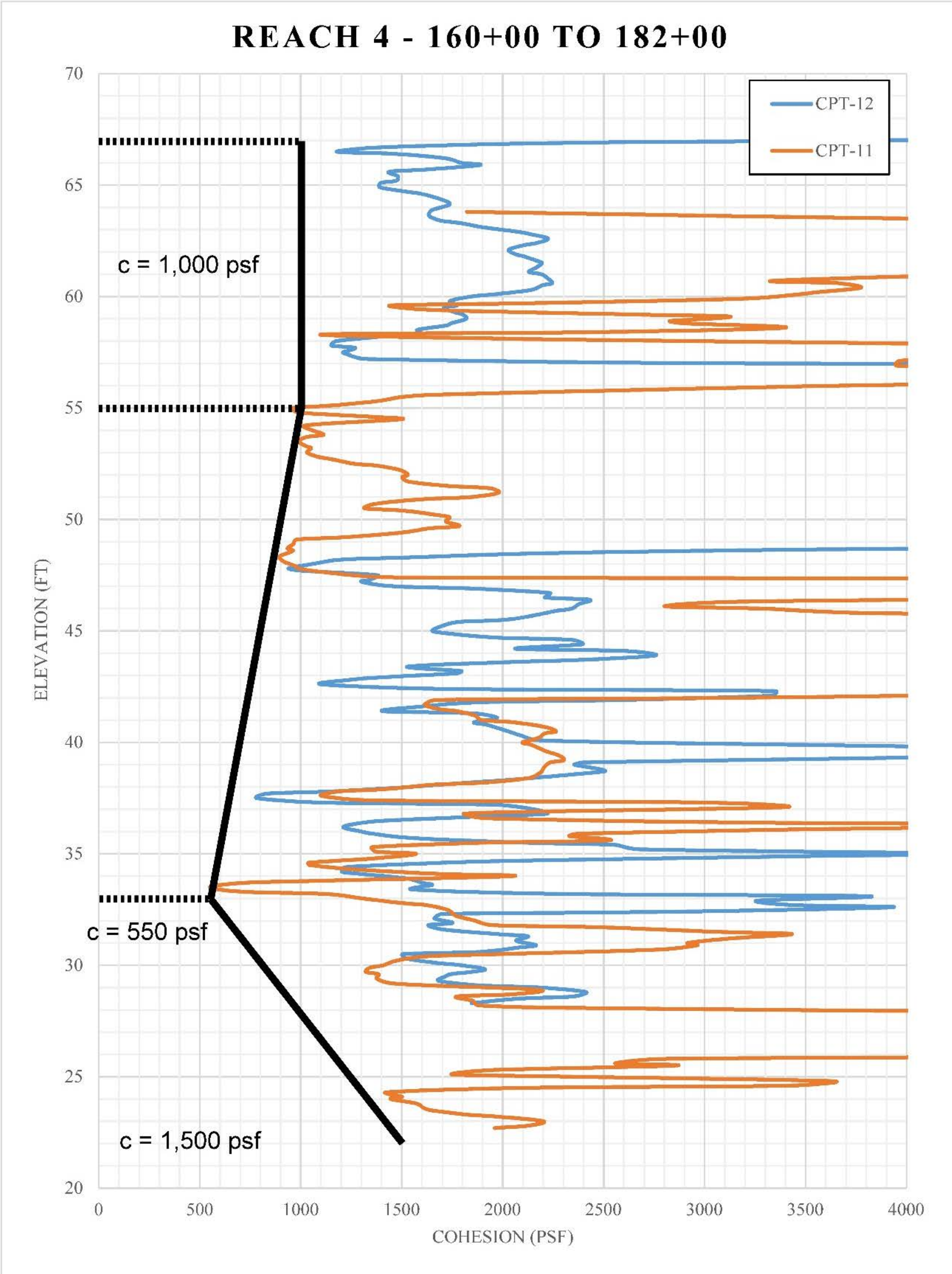

Figure 16. Reach 4 CPT Results and Selected Undrained Strengths

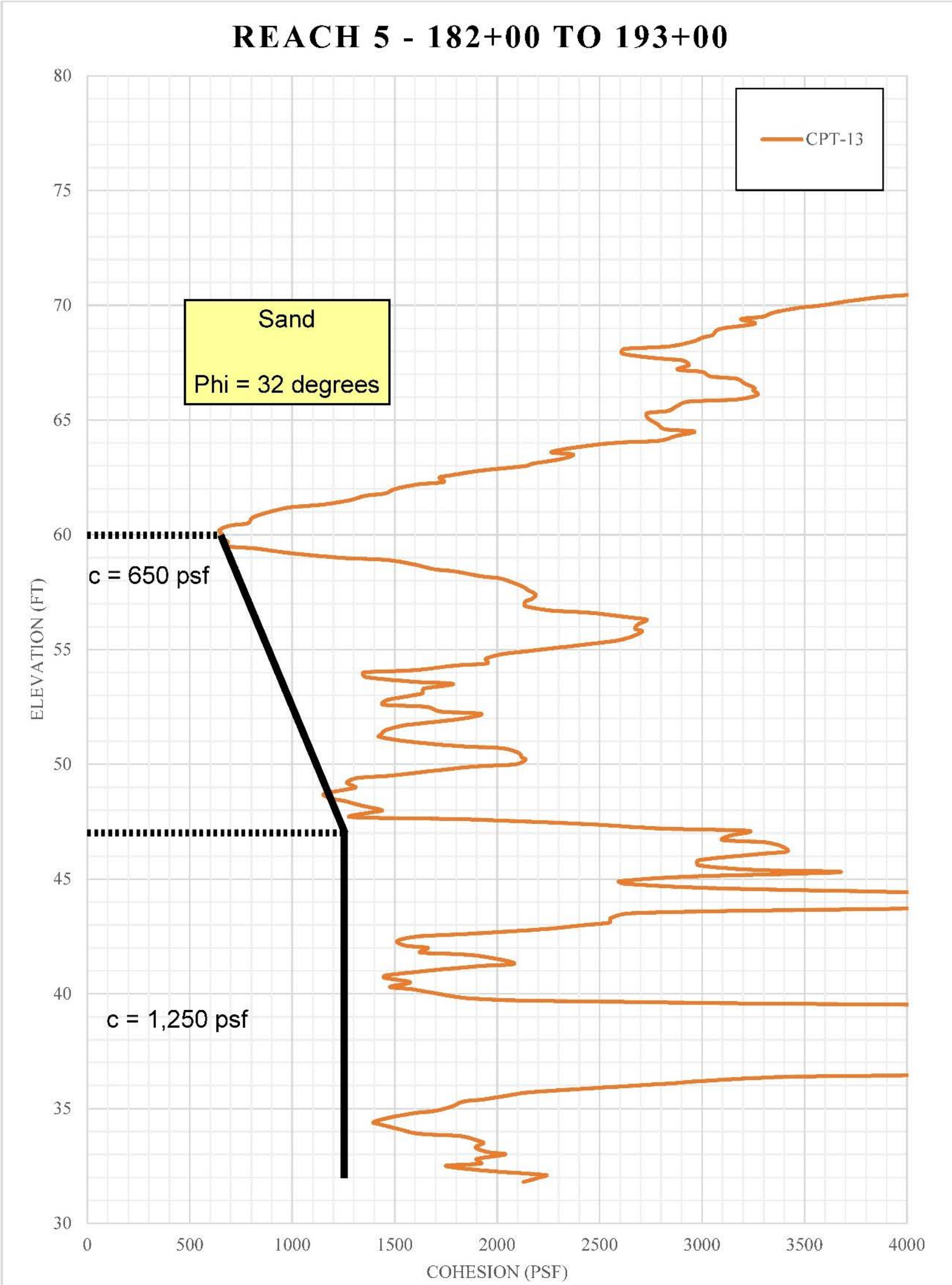

Figure 17. Reach 5 CPT Results and Selected Undrained Strengths

8.4.3.2 Drained Shear Strengths. The drained shear strengths (S-strengths) for the clays and sands in the channel slopes were selected based on the results of the classification of the soils, the SPT N-values, and two consolidated-undrained triaxial tests and the SPT results, respectively. For the clays, one of the triaxial tests was performed on a high-plastic clay with about 15% sand while the other was performed on a silty clay with about 45% sand. The drained strengths from the triaxial tests are listed below:

Silty clay (45% sand)	$c' = 0$ psf	$\phi' = 34.5^{o}$
High-plastic clay (15% sand)	$c' = 180$ psf	$\phi' = 30^{o}$

Based on these two results, the lower drained strengths (S-Strengths) of $c' = 180$ psf and $\phi' = 30^{o}$ were selected for all of the clays on the Project to be conservative. Based on our review of all of the borings and the laboratory test results, we believe these strengths are appropriate for all of the clays on the Project, even the soft soils encountered in boring SPT-16.

The consolidated-undrained strengths (R-strengths) from these two tests varied significantly, likely due to the difference in sand content. The result for the silty clay (45% sand) was a $c = 90$ psf and a $\phi' = 18^{o}$. For the high-plastic clay (15% sand), the result was a $c = 450$ psf and a $\phi' = 12.5^{o}$. The lower of these two values is very low for clays and using the lower value was considered to be overly conservative. Therefore, these two strengths were averaged and the average value was assigned to all of the clays resulting. Consequently, R-strengths of $c = 270$ psf and $\phi' = 15^{o}$ were used for all of the clays on the Project.

For the cohesionless, silty sands encountered on the Project, the drained strengths were determined using the results of the SPT N-values obtained in the sands during the drilling operations. A review of the uncorrected N-values indicated a minimum value of 5 and an average value of 16.5. Using the relationship in Bowles (Bowles, 1997) that correlates uncorrected N-values to angles of internal friction in sands, friction angles of 32.5^{o} and 35.8^{o} were determined for the minimum N-value and average N-value, respectively. To be conservative, a friction angle of 32^{o} was selected for all of the cohesionless sands on the Project. These calculations are presented in Attachment E.

As mentioned in the discussion on the selection of undrained strengths, it is believed that the clayey sands will behave more similarly to cohesive soils rather than cohesionless soils. Therefore, to be conservative, the drained strengths for the clays on the Project were also assigned to the clayey sands.

8.4.4. Stability Analyses

8.4.4.1 Method of Analyses. Slope stability analyses were performed using the slope stability analysis software Slide v.6.0. All analyses were performed using Spencer's method. Stability analyses were performed for the end-of-construction cases using Q-strength data and for the long-term cases using S-strength data. The drawdown cases were performed using the multi-stage, drawdown evaluations with composite S-strength and R-strength data in accordance with the procedures outlined in EM 1110-2-1902, Slope Stability (USACE, 2003).

Circular failure surfaces searches were performed for each analyzed cross-section and stability case. Based on our experience, non-circular failure surfaces are not as critical with the types of stratigraphies modeled at this project. However, this conclusion was confirmed by performing a non-circular failure surface search on the most critical cross-section and loading case determined by the results of the circular failure surface searches.

Cross-sections of the channel were based on the 60% design drawings. The proposed channel will be about 10 feet high with bottom widths of 15 to 40 feet. Side slopes of 2H:1V were used but the rip rap and geocell slope protection were neglected to be conservative. Since the proposed slopes are 2H:1V for the entire project, the critical cross-section locations were based on the height of the proposed banks. For Reaches 1 through 3, because they are relatively long reaches, two cross-sections were initially evaluated and the more critical selected for further analyses. In Reaches 4 and 5, because of their relatively short length, only a single, critical cross-section was selected. However, two cross-sections were analyzed in Reach 4 due to the conditions encountered in boring SPT-16, as described in previous sections. These cross-sections were used with the results of the borings and the shear strength selections to develop the analyzed sections. At each analyzed section, both banks were analyzed for stability. However, only the more critical of the banks is presented and discussed. The analyzed sections, along with the results of the stability analyses, are shown in Attachment F.

8.4.4.2 Load Cases Analyzed. As mentioned above, the stability of the channel slopes was performed in accordance with EM 1110-2-1902, Slope Stability (USACE, 2003). The load cases considered for the stability analyses are discussed below.

Case 1: End of Construction. This case was evaluated for all of the analyzed sections. In this case, unconsolidated undrained (Q) strength parameters were used for this evaluation. The water level in the channel was assumed to be below the bottom of the proposed invert level. For this end-of-construction condition, this

assumed water level is the most critical assumption since the water is a stabilizing load for the slope.

Case 2: Steady State Seepage. The stability analyses for the case of steady seepage were performed assuming the 100-year flood event is at that level for a long period sufficient to saturate the bank soils. This is a conservative assumption since it is anticipated that the 100-year event will not remain high enough for a sufficient period to saturate the bank soils. S-strengths were used for these analyses.

Case 3: Sudden Drawdown. For the sudden drawdown analysis, it was assumed that the water level within the channel dropped from the 100-year level to near the bottom of the proposed channel. This is a very conservative assumption since it assumes the 100-year flood level will remain high enough in the channel to completely saturate the bank soils. In these analyses, the drained (S) strength parameters were used for the sand layers and the lower of the drained (S) and undrained (R) shear-strength envelopes was used for the clays. The staged drawdown feature of Slide v.6.0 was utilized and the program's documentation indicates that the procedure incorporated in the software matches the procedures outlined in EM 1110-2-1902, Slope Stability (USACE, 2003).

Case 4: Critical Flood Level. Finally, a critical flood analysis was performed on the reach cross-section that exhibited the lowest safety factor for the Case 2, steady seepage at the 100-year flood level. For Case 4, steady seepage conditions and S-strengths were used. The critical flood level was found by varying the water level within the channel and determining which flood level resulted in the minimum safety factor. Since the other cross-sections exhibited higher safety factors for Case 2, if this case were run on the other cross-sections they would exhibit safety factors greater than those determined for the critical cross-section.

8.4.4.3 Minimum Required Safety Factors. The required minimum safety factors used for each of the load cases was developed using the criteria in EM 1110-2-1902, Slope Stability (USACE, 2003). Table 3-1 in the EM presents the required minimum safety factors for new embankment dam slopes. However, in Section 3-4 of the EM, there is discussion of the minimum required safety factors to use in the stability analyses of other slopes. Within paragraph 3-4, the EM states:

> *…Typical minimum acceptable values of factor of safety are about 1.3 for end of construction and multistage loading, 1.5 for normal long-term loading conditions, and 1.1 to 1.3 for rapid drawdown in cases where rapid drawdown represents an infrequent loading condition. In cases where rapid drawdown represents a frequent loading condition, as in pumped storage projects, the factor of safety should be higher.*

Based on this guidance, required minimum safety factors of 1.3, 1.5, and 1.3 were selected for the end of construction case, the long-term 100-year flood level steady seepage and critical flood steady seepage cases, and the rapid drawdown case, respectively. We believe the rapid drawdown case may be a relatively frequent loading condition in the channel so a higher required minimum safety factor should be considered for this case.

8.4.4.4 Analyses Results. The results of the stability analyses are summarized in **Table 8** and presented in Attachment F. As can be seen in the table, the calculated critical safety factors were all above the required minimum safety factors.

Table 8. Summary of Stability Analyses Results

Reach (see Figures 6 and 7)	Case Analyzed	Critical F.S. (Req'd min.)
Reach 1 (86+00 to 120+00)	End of Construction (Q)	2.44 (1.3)
	Steady Seepage (S)	3.05 (1.5)
	Sudden Drawdown (R,S)	1.61 (1.3)
Reach 2 (120+00 to 140+00)	End of Construction (Q)	2.68 (1.3)
	Steady Seepage (S)	2.61 (1.5)
	Sudden Drawdown (R,S)	1.62 (1.3)
Reach 3 (140+00 to 160+00)	End of Construction (Q)	2.26 (1.3)
	Steady Seepage (S)	2.19 (1.5)
	Sudden Drawdown (R,S)	1.40 (1.3)
Reach 4 (160+00 to 182+00)	End of Construction (Q)	2.69 (1.3)
	Steady Seepage (S)	2.69 (1.5)
	Sudden Drawdown (R,S)	1.73 (1.3)
Reach 4.1 (SPT-16 at 177+00)	End of Construction (Q)	2.41 (1.3)
	Steady Seepage (S)	3.07 (1.5)
	Sudden Drawdown (R,S)	1.93 (1.3)
Reach 5 (182+00 to 193+00)	End of Construction (Q)	1.44 (1.3)
	Steady Seepage (S)	1.69 (1.5)
	Sudden Drawdown (R,S)	1.42 (1.3)
Critical Drained Section	Critical Flood	1.65 (1.5)
Critical Undrained Section	End of Construction (Q)	4.50 (non-circular) (1.3)

For Reaches 3 and 5, where sand was present in the proposed channel slope, the critical safety factors were infinite-slope type failures with safety factors of 1.2 or greater. Infinite-slope type failures represent a theoretical minimum safety factor but the failure surfaces are very shallow, raveling-type of surfaces that are maintenance issues and do not impact the integrity of the slope. Typically, a safety factor greater than 1.0 for an infinite-slope type failure is considered acceptable.

Therefore, for cases where an infinite-slope type surface was the critical failure surface and the safety factor was greater than 1.0, deeper surfaces were analyzed to determine a more appropriate safety factor to confirm that more realistic failure surfaces had safety factors greater than the required minimum.

8.4.5. 1.5H:1V Slopes

It is understood that steeper slopes of up to 1.5H:1V may be required in isolated areas to maintain the channel capacities, such as at bridges or other channel constrictions. If 1.5H:1V slopes must be used in an area, we recommend that these slopes be constructed with rip rap or channel protection stone. If an encroachment into the channel is prohibitive, this may require overexcavating the soil into the bank then rebuilding the slope with the rip rap or channel protection stone. The toe of this rock zone should be keyed into the channel bottom to provide stability. Stability analyses would be needed to determine the proper configuration and amount of rip rap or channel protection stone to use, but it is anticipated that a slope 10 feet high would require a rock zone that was a few to several feet thick for adequate stability.

An evaluation of these isolated areas should be performed after the design progresses and these locations are known. Using the results of the borings and the laboratory testing, stability analyses can be performed to properly design the configuration of these rock fill slopes.

9. UPRR TRESTLE AND OTHER CULVERT DESIGNS

9.1. General

As mentioned earlier in this report, current plans call for the demolition of the existing UPRR timber trestle bridge over Berryessa Creek and replacement with a two cell reinforced concrete culvert. The UPRR culvert project extends from channel station 160+44 to 161+46. In addition, new culverts are planned for lateral drainage features entering the channel at Los Coches Avenue and Piedmont Avenue.

Preliminary plans indicate that the proposed UPRR culvert will be a double, 10-foot wide (W) and 9-foot high (H) reinforced concrete box (RCB) structure. The culvert invert elevation is anticipated to range from elevation 49.25 to 49.67 feet, which is approximately one foot below the lowest current invert elevation in the existing creek.

The proposed culvert at Los Coches is a 15-foot wide (W) and 7-foot high (H) reinforced concrete box (RCB) structure. The culvert invert elevation is anticipated to range from elevation 19.92 to 33.23 feet.

The proposed culvert at Piedmont is a 14-foot wide (W) and 7-foot high (H) reinforced concrete box (RCB) structure. The culvert invert elevation is anticipated to range from elevation 26.21 to 30.71 feet.

9.2. Foundation Preparation

Based on subsurface conditions encountered in the exploratory borings and on potential high groundwater conditions it is anticipated that saturated, clayey soils could be encountered at the proposed base of culvert elevations. It is expected that these conditions will produce a relatively soft bearing surface and difficult working conditions. Therefore, it is recommended that an engineered fill mat be constructed within the area below the proposed culverts and any appurtenant wing wall footings. The engineered fill should be constructed as follows:

- Over-excavate at least 2 feet below the base of the culvert slab or wall footing elevation.
- At the UPRR culvert location, cut and remove all existing pile foundations for the exiting trestle at a depth of at least 6 inches below the excavated surface.
- If necessary, stabilize the soft subgrade by working open-graded aggregate material (typically ¾-inch or 1.5-inch crushed rock, coarser for softer subgrade) at least 4 to 6 inches into the soil.
- Place non-woven geotextile, Mirafi 180N or approved equivalent, over the stabilized subgrade.
- Place and compact well-graded select fill. The fill can be either Crushed Aggregate Base (Green Book Section 200-2.2) or Crushed Miscellaneous Base (Green Book Section 200-2.4) to specified compaction over the geotextile.

9.3. Culvert and Retaining Wall Backfill

It is expected that due to the clayey nature of most of the on-site material, it will not be suitable as a backfill immediately behind site retaining walls. Free draining material should be used for backfill behind retaining walls. Consequently, an approved import material should be used for the backfill within at least 2 feet behind the back side of the wall. Suitable material should have a Sand Equivalent of about 30, an Expansion Index of less than 20, and fines content (passing #200 sieve) of less than 15 percent. The suitability of the import material for retaining wall backfill should be verified at the time of construction.

The backfill should be moisture-conditioned to at least optimum moisture content and compacted in loose horizontal lifts not more than 8 inches in uncompacted thickness to at least 90 percent of the maximum dry density as evaluated by the latest version of ASTM D 1557. Where bare ground is present behind the top of the wall, the backfill should be capped with a concrete swale or with at least 12 inches of relatively impervious clayey material (USCS Classification CL) and sloped to prevent ponding of water.

9.4. Subdrainage

Retaining walls should be constructed to limit potential for hydrostatic pressure built-up behind the wall by installing subdrains near the base of the wall. The drain pipe should consist of a minimum 4 inch diameter perforated PVC pipe surrounded by 2 cubic foot per foot of the Class II Permeable Material (Caltrans Standard Specifications - Section 68), or by ¾ inch crushed rock (Standard Specification for Public Works Construction ("Greenbook") - Section 200-1.2) wrapped in suitable non-woven filter fabric, e.g., Mirafi 140NL or approved equivalent. Perforations in the drain pipe should have a maximum diameter of 1/4 inches or 3/8 inches for Class 2 Permeable or ¾-inch crushed rock drain material, respectively, spaced 3 inches on center, and be arranged in 2 rows at a radial spacing of approximately 120 degrees. The axis of the included angle between the perforation rows should be positioned downward to form a flowline. The drain pipe should discharge through a solid pipe to appropriate outlets, such as the storm drain system or through the wall. The maximum length of the drain pipe between discharge outlets should not exceed 200 feet.

Unless the culvert designs include lateral and uplift pressures for hydrostatic forces, continuous subdrains should also be installed behind the base of the culvert walls. If the UPRR, Los Coches, and Piedmont culverts are being designed to resist uplift pressures, a groundwater elevation of +55, +30, and +35 feet, respectively, should be utilized.

9.5. Settlement

Based on the consolidation testing of the saturated clayey foundation soil underlying the UPRR culvert it is expected that some long term settlement of the culvert will occur. The total settlement at the midpoint of the culvert is estimated to be approximately 1.5 inches. This amount of settlement is not expected to be problematic to the structure or rail subgrade, however, it is recommended that a camber in the UPRR culvert invert incorporate this amount of potential differential settlement from the ends to the midpoint of the culvert. Grading provisions above the UPRR culvert should incorporate this amount of potential settlement at the centerline of the channel.

Settlements of the other two culverts, wing walls or retaining structures placed on foundation soils prepared in accordance with Section 9.2 ''Foundation Preparation'' are estimated to be less than one inch.

9.6. Design Parameters

The culverts and appurtenant retaining walls may be designed using the following parameters. These design values are based on foundation preparation and grading recommendations presented in this report.

9.7. Vertical Loading

Vertical loads on the UPRR culvert should be assessed by the design chart presented in Figure 5.2 of USACE EM 1110-2-2902 ‘‘Engineering and Design, Conduits, Culverts and Pipes’’ for railroad loading and Figure 8-16-1 in the AREMA Manual for Railway Engineering Chapter 8. Both charts should be consulted for this culvert because total loading varies between the two charts depending on embedment depth. Based on maximum density testing of on-site soils, the dead load curve for both design charts should be adjusted to reflect a total unit weight of 130 pcf. Vertical loads on the Los Coches and Piedmont culverts should be assessed by the design chart presented in Figure 5.2 of USACE EM 1110-2-2902 ‘‘Engineering and Design, Conduits, Culverts and Pipes.’’

If the UPRR, Los Coches, and Piedmont culverts are being designed to resist uplift pressures, a groundwater elevation of + 55, + 30, and + 35 feet, respectively, should be utilized.

9.8. Lateral Loading

9.8.1. Retaining Walls

Retaining walls should be designed for the appropriate lateral earth pressure based on the following design parameters and equivalent fluid pressures (**Tables 9 and 10**):

Table 9. Retaining Wall Design Parameters

Active Earth Pressure Coefficient	0.39
At-Rest Earth Pressure Coefficient	0.56
Allowable Passive Pressure Coefficient	1.7
Allowable Friction Coefficient	0.30
Total Unit Weight	130 pcf
Buoyant Unit Weight (below groundwater)	67.6 pcf

Note: Assumes level backfill behind the wall

Table 10. Equivalent Fluid Pressures[1]

Description	Above Water Table (pcf)	Below Water Table (pcf)[2]
Active Equivalent Earth Pressure	51	26
At-Rest Equivalent Earth Pressure	73	38

Passive Equivalent Earth Pressure	221	115

Note: (1) Assumes level backfill behind the wall
(2) Soil pressure only

Determination of whether the active or at-rest condition is appropriate for design will depend on the flexibility of the walls. In clayey soils walls that are free to rotate at least 0.01 radians (deflection at the top of the wall of at least 0.01 x H) may be designed for the active condition. Walls that are not capable of this movement should be assumed rigid and designed for the at-rest condition. The effect of any surcharge (dead or live load) located within a 1(H):1(V) plane drawn upward from the heel of the wall footing should be added to the lateral earth pressures by multiplying the surcharge pressure by the appropriate earth pressure coefficient.

Where design requires that seismic earth forces be considered the following appropriate seismic earth forces should be utilized (**Table 11**).

Table 10. Summary of Seismic Earth Forces

Seismic Earth Force (100 year return period)	$17.6H^2$ lbs/foot of wall
Seismic Earth Force (144 year return period)	$20.0H^2$ lbs/foot of wall
Seismic Earth Force (475 year return period)	$30.7H^2$ lbs/foot of wall
Seismic Earth Force (949 year return period)	$37.1H^2$ lbs/foot of wall
Seismic Earth Force (MCE or 2475 year return period)	$24.4H^2$ lbs/foot of wall

Seismic earth force should be applied at a distance of 2/3H up from the base of the wall.
H = Height of Wall (feet)

9.8.2. Culverts

For culvert design, the AREMA manual requires that minimum and maximum earth pressure coefficients of 0.33 and 1.0, respectively, be used to evaluate lateral pressure on the structure. We recommend that the Los Coches and Piedmont culverts be designed using the same earth pressure coefficients. Vertical pressures used in the calculations should be those calculated by the design charts discussed in Section 9.7, Vertical Loading. If the UPRR, Los Coches, and Piedmont culverts are being designed to resist uplift pressures, a groundwater elevation of +55, +30, and +35 feet, respectively, should be utilized.

9.9. Bearing Capacity

Design of the invert slabs of the culverts and footing foundations for retaining walls should be designed based on an allowable bearing capacity defined by the following equation:

q_{all} = 1120 + 260D + 60B (psf) (3,000 maximum)

q_{all} = allowable bearing pressure

D = minimum footing embedment (feet)

B = footing width (feet)

The allowable bearing pressure may be increased by one-third when considering live loads and seismic loads.

The modulus of subgrade reaction for the design of the culvert slabs can be calculated as:

$$K_s = \frac{280}{B} \ in\ pci$$

where B is the governing width of the element in feet, but no more than 14 times the thickness of the element.

9.10. Cutoffs

The upstream and downstream edges of the culvert slab/apron should include a full width cutoff wall extending at least 3 feet below the base of the slab or at least 6 inches below the potential scour depth, whichever is deeper.

10. FLOODWALLS

10.1. General

Based on the 60% design drawings, it appears that a short floodwall is needed on the left bank to contain the channel flows and an adequate freeboard between Stations 103+50 and 115+23 and Stations 171+00 and 175+50. The floodwall will only be a few feet high at the most per the 60% drawings.

The two SPT borings in the area of the floodwall between Stations 103+50 and 115+43 (SPT-4 and SPT-5) encountered 3 feet of uncontrolled clay fill at the ground surface. This uncontrolled fill is not considered suitable to support the proposed floodwall. Therefore, it is recommended that this fill be overexcavated, replaced, and recompacted beneath the floodwall or the floodwall should be founded in the natural clays below the fill. If overexcavation and replacement is performed, it is possible that the existing material can be reused as fill, based on the classifications of the material encountered in the borings; however, this will have to be confirmed in the field during construction. Any fill placed to support the floodwall should be placed in 8-inch thick loose lifts and compacted to at least 95% of the material's maximum dry density as determined by ASTM D 1557.

The floodwall between Stations 171+00 and 175+50 lies between an existing building and the top of the channel bank. To construct the floodwall, the existing material behind the building will be overexcavated about 5 feet to construct the floodwall. Following the floodwalls construction, the overexcavated material will be replaced to the original grade. Because the floodwall is essentially buried within the soil, the net load on the foundation soils beneath the floodwall will be very low.

The floodwalls should be designed in accordance with the following Corps' Engineering Regulations and Engineering Manuals:

ER 1110-2-1150 Engineering and Design for Civil Works Projects
ER 1110-2-1806 Earthquake Design and Evaluation for Civil Works Projects
EM 1110-2-2100 Stability Analysis of Concrete Structures
EM 1110-2-2104 Strength Design for Reinforced-Concrete Hydraulic Structures
EM 1110-2-2502 Retaining and Flood Walls

10.2. Earth Pressures and Uplift

Most of the load on the floodwalls will be from the hydrostatic loads from the channel flows. If earth pressures are needed for the structural design, the values listed in **Tables 9 and 10** should be used.

Cohesive soils should be assumed for the backfill around the floodwalls. Granular material should not be used for backfill unless needed for seepage control at the landside toe of the floodwall. However, any seepage relief needs to be analyzed and designed for appropriate exit gradients.

The floodwall design should also account for uplift on the base of the foundation. The uplift should vary linearly from the heel to the toe of the wall. The uplift pressure value at the heel should be equal to the full hydrostatic pressure from the flood level while the uplift pressure value at the toe should be equal to the full hydrostatic pressure from the tailwater level.

10.3. Sliding

Based on the results of the borings, the proposed floodwalls should bear on clay soils. For concrete on clay soils, it is recommended that a friction factor of 0.30 be used to determine the sliding factor of safety along the base of the walls.

10.4. Bearing Capacity

The allowable bearing capacities of the floodwall foundations were determined using the procedures in EM 1110-1-1905, Bearing Capacity of Soils. The undrained strengths from the borings along the floodwall were used and Meyerhof's equation was considered. The

calculations indicate an allowable undrained bearing capacity of the soils beneath the floodwall equal to 1,250 psf. It was assumed the floodwall alignment in relation to the slope was as shown in the 60% design drawings. The undrained bearing capacity calculations for the floodwall are presented in Attachment G.

The allowable bearing capacity of the soils should be calculated based on both undrained and drained strengths. However, the bearing capacity calculation using drained strengths requires the dimensions of the floodwall foundation, which are not known at this time. However, we estimated a minimum floodwall foundation width assuming a head differential of 2 feet and an embedment of 2 feet. Using the line of creep analysis presented in EM 1110-2-2502, the calculations indicate that a minimum floodwall foundation width of 4.5 feet should be considered.

Once the floodwall design is complete for the 90% design and the foundation dimensions are known, the allowable bearing capacity of the soils using drained strengths should be checked. In addition, the line of creep analysis should be reviewed to determine that the foundation width and embedment are sufficient to provide an adequate safety factor against piping.

10.5. Settlement

If the floodwalls are designed for the allowable bearing capacity recommended in the previous section, we estimate that the floodwall total settlements will be less than one inch. Differential settlement between floodwall monoliths should be less than 0.5 inches. However, once the floodwall is completed to the 90% level, this should be confirmed by checking the settlement based on the final dimensions and actual bearing pressures of the foundation.

11. TRANSITION STRUCTURES

Transition structures will be constructed at several locations along the channel. In the 60% design drawings, transition structures are located at each of the bridge crossings except for Yosemite Drive and Ames Avenue. Based on our review of the 60% design and the boring results, we see no significant geotechnical impacts on the design or construction of the transition structures with the exception of the transition structure beneath the Los Coches Avenue bridge.

The Los Coches Avenue bridge was constructed in the mid-1960s and is currently the responsibility of the City of Milpitas. The structure is a two-span bridge with the abutments and pier supported on driven, pre-cast concrete piles. Based on as-built drawings of the bridge, the piles were roughly 50 feet long and designed for an axial capacity of 45 tons.

The excavation for the transition structure beneath Los Coches Avenue will remove soil from in front of the abutment piles, reducing the axial and lateral capacity of the abutment piles. Since this

nearly 50-year old bridge likely doesn't meet current design standards, this excavation makes the situation worse.

In addition, with the soil in front of the abutment piles removed, deflections of the abutment piles will increase. The magnitude of this deflection cannot be accurately determined without a very detailed structural study of the bridge. However, the abutment deflection could impact the transition structure and possibly damage or crack the transition structure. Therefore, it is recommended that the transition structure beneath Los Coches be designed to accommodate some movement from the bridge abutment piles.

The modulus of subgrade reaction for the design of the transition slabs can be calculated as:

$$K_s = \frac{240}{B} \ \ in\, pci$$

where B is the governing width of the element in feet, but no more than 14 times the thickness of the element. This K_s value is less than that used for the culvert slabs since the transition slabs do not exert a significant load on the subgrade and soft soils beneath the transition slabs may not be removed during construction.

Due to the potential for the presence of granular layers near the channel invert, it is recommended that the cut off walls at the upstream and downstream ends of the transition structures be extended to a depth of 4 feet below the channel invert. Due to the corrosive nature of the soils on the Project, it is recommended that concrete cut off walls be used rather than sheet pile walls.

12. SCOUR AND EROSION PROTECTION

It is understood that rip rap will be used for scour protection near the base of the slopes along the channel. Rip rap is also being used for the channel invert between approximately Stations 115+00 and 164+00. The rip rap material size and toe-down depth should be designed in accordance with EM 1110-2-1601 and ETL 1110-2-120.

It is anticipated that the rip rap will be imported to the site from commercial sources. The construction documents should require the contractor to provide rip rap from only qualified and approved sources that meet the requirements of the Corps and CalDOT. The commercial source used to prepare the construction cost estimate was the Lake Herman Quarry in Vallejo, California. The phone number for this quarry is 707-643-3261.

Based on the 60% design drawings, geocells, filled with aggregate or concrete, will be used for erosion protection on the upper portions of the channel slope, above the rip rap. Based on our review of the 60% design and the results of the borings, we see no geotechnical issues with using the geocells, provided they are designed and installed per the supplier's recommendations. The one caveat to this is the corrosivity of the soils. Based on the 60% design, it appears that the geocells

are staked into the slope with metal rods. Any anchorage system or other metals that are part of the geocell system will need to be resistant to this corrosion.

13. SOIL CORROSIVITY

Laboratory testing was performed on representative soil samples to evaluate soil corrosivity to buried steel and concrete. **Table 12** presents the results of the corrosivity testing.

Table 11. Corrosivity Test Results

Location	Sample ID	Depth (feet)	pH	Minimum Resistivity (ohm-cm) CTM 643	Chloride Content CTM 422	Soluble Sulfate Content CTM 417
SPT-4	SK-1	0 – 5	7.7	1,160	0.0025%	0.0092 %
SPT-5	SK-1	0 – 5	7.8	1,274	0.0023%	0.0270 %
SPT-12	SK-1	0 – 5	7.3	488	0.0084%	0.0566 %
SPT-12	SPT-8	17.5 – 19	7.7	1,908	0.0022%	0.0032 %
SPT-13	SK-1	0 – 5	7.7	910	0.0036%	0.0124 %
SPT-13	SPT-6	12.5 – 14	8.0	3,116	0.0006%	0.0019 %
SPT-16	SPT-1	2 – 3.5	7.6	2,388	0.0004%	0.0057 %
SPT-18	SK-1	0 – 5	7.9	2,228	0.0004%	0.0057 %

Per CBC 2013/ IBC 2012, Section 1904.3, concrete subject to exposure to sulphates shall comply with the requirements set forth in ACI 318, Section 4.3. Based on the measured water soluble sulphate results the exposure of buried concrete to sulphate attack should be considered ‘‘not applicable’’, i.e., exposure class S0 per ACI 318, Table 4.2.1. Consequently, injurious sulfate attack is not a concern for concrete with a minimum 28-day compressive strength of 2,500 psi.

Per CBC 2013, Section 1904.4, concrete reinforcement should be protected from corrosion and exposure to chlorides in accordance with ACI 318, Section 4.4.

The minimum soil resistivity values indicate that the on-site soils have a high to very high metallic corrosion potential. A corrosion specialist should be consulted regarding suitable types of piping and necessary protection for underground metal conduits for this project.

14. PAVEMENT DESIGN PARAMETERS

14.1. General

Access roads are planned along both sides of the proposed channel for inspection and maintenance purposes. However, the type of roadway surface has not been determined at this time. General recommendations for the construction and design of the proposed access roads are presented below.

14.2. Subgrade Design

Based on the results of the laboratory testing, it is recommended that the proposed access road pavements be designed based on an R-value of 8. This recommendation assumes that the pavement subgrades are prepared and constructed as recommended in the following section.

14.3. Subgrade Construction Recommendations

The subgrade for the proposed access roads should be stripped of all topsoil or organic soils to a point 5 feet outside of the roadway limits. Once the subgrade is cut to grade, it should be proofrolled with heavy construction equipment and any areas that pump or deflect excessively should be overexcavated. After proofrolling, the subgrade should be compacted then scarified to ensure a good bond with the initial fill lift.

The fill beneath roadways should be spread in 8-inch thick loose lifts and uniformly compacted with a sheepsfoot-type roller to 95% of the material's maximum dry density (ASTM D 1557). The moisture content of the fill should be within 3±% of the material's optimum moisture content.

15. OTHER CONSTRUCTION RECOMMENDATIONS

15.1. Site Preparation and Fill Placement

The surface should be cleared of any topsoil, pavement, structures, vegetation, trash, and debris prior to commencement of any earthwork or foundation construction. Any subterranean installations such as pipes, utility collectors, tanks, etc. that are not to be preserved should be abandoned per the geotechnical engineer's recommendations and in accordance with applicable regulations.

Based on the 60% design cross-sections, some areas will require small slivers of fill to be placed on existing slopes. Where new engineered fill will be placed on an existing slope, the fill should be supported by a shear key constructed at the base of the toe of slope. The key should extend to a minimum depth of 3 feet below existing grade, have a minimum bottom width of 5 feet, and side slopes of 1H:1V.

In addition, existing slopes to receive fill must be benched with 2-foot high vertical cuts prior to fill placement. In order to adequately compact the face of fill slopes, it is recommended that the fill slopes be overbuilt by a foot or so and trimmed back to the final configuration.

Fill should be placed in horizontal lifts not more than 8 inches in loose, uncompacted thickness. All fill placement associated with the replacement of the excavated soils, or fill placed to achieve finished grade or subgrade should be moisture-conditioned to within 3± percent of the optimum moisture content and compacted to at least 92 percent of the maximum dry density, as evaluated by the latest version of ASTM D 1557. However, fill placed below pavements should be compacted to at least 95 percent of the maximum dry density, as evaluated by the latest version of ASTM D 1557.

Based on the findings from the borings, it appears that most of the excavated on-site soils may be re-used as compacted fill provided they are free of organics, deleterious materials, debris and particles over 3 inches in largest dimension. Locally, particles up to 4 inches in largest dimension may be incorporated in the fill soils.

However, it should be noted that the softer, wetter soils on the Project were encountered near the existing channel invert. These soils may need to be spread, disked, and dried before they can be used for fill.

Specifically, an area of note was in the vicinity of boring SPT-16 (Station 177+00) which encountered about 13 feet of soft to medium stiff clay near the existing channel invert. It may be difficult to excavate these soft soils and special efforts or equipment may be required to remove these soils. It is anticipated that these soils will not be suitable for reuse as fill without drying significantly.

15.2. Temporary Excavation and Construction Slopes

The on-site soils are not expected to pose unusual excavation difficulties, and therefore, conventional earth-moving equipment may be used. Localized sloughing/raveling of exposed soil intervals should be anticipated. All excavations should be performed in accordance with CalOSHA regulations. The on-site soils above the groundwater level may be considered a Type B soil, as defined by the current CalOSHA soil classification system.

Unsurcharged excavations: Temporary short-term, generally less than five days, unsurcharged excavations shallower than 4 feet may be excavated with vertical sides. Sides of temporary, unsurcharged, excavation deeper than 4 feet should be sloped back at an inclination of 1H:1V or flatter. Where space for sloped sides is not available, shoring will be necessary.

Surcharge setback recommendations: Stockpiled (excavated) materials should be placed no closer to the edge of a trench excavation than a distance defined by a line drawn upward from the bottom of the trench at an inclination of 1(H):1(V), but no closer than 4 feet. A greater setback may be necessary when considering heavy

vehicles, such as concrete trucks and cranes. Alternatively, a shoring system should be designed to allow reduction in the setback distance.

Excavation below groundwater: The on-site soils below the groundwater level should be considered a Type C soil. It should be anticipated that excavation at or below the current creek level will encounter groundwater. In these areas temporary control and diversion of both surface water and groundwater seepage will be necessary.

15.3. Shoring

It is estimated that the maximum depth of temporary excavation required for this project will be about 10 to 15 feet. Cantilevered or anchored steel sheet pile walls may be considered for the temporary support of excavation, depending on the required excavation depth. Cantilevered sheet pile walls are typically used for excavation depths less than 12 feet. Shoring for the UPRR culvert should be designed based on the appropriate requirements in the AREMA Manual for Railway Engineering, Chapter 8. Shoring in other areas of the alignment should be designed based on the appropriate Corps of Engineers' Engineering Manuals.

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Appendix E Hazardous Toxic, and Radioactive Waste (HTRW) Soil Sampling Report

HTRW SOIL SAMPLING REPORT
INCLUDING TWO GROUNDWATER GRAB SAMPLES
UPPER BERRYESSA CREEK FLOOD RISK MANAGEMENT PROJECT
BETWEEN MONTAGUE EXPRESSWAY AND YOSEMITE DRIVE
SANTA CLARA COUNTY
MILPITAS, CALIFORNIA

April 20, 2015

Prepared for:

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Tetra Tech Project 100-SWW-T31331 Task 3.62

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1.0 INTRODUCTION AND SCOPE OF WORK

Tetra Tech, Inc. performed soil and groundwater sampling in areas within the project boundaries that are intersected by Jones Chemical, Inc. (JCI) and Great Western Chemical Company (GWCC) groundwater plumes. The volatile organic compounds (VOCs) trichloroethene (TCE), tetrachloroethene (PCE) and associated breakdown products are known to be present in soil and groundwater at each of these two sites, both of which are located hydraulically up-gradient from the Project boundaries, with a general west-northwest groundwater flow direction. Figure 1 and Figure 2 depict the approximate extent of each groundwater plume in the creek channel area.

The scope of work consisted of completing five direct-push soil borings (ST-1 through ST-5) to 20 feet below ground surface (bgs), field-monitoring soil conditions, and collecting soil samples at 5-foot depth intervals for laboratory analysis. Borings ST-1 and ST-2 were completed within the GWCC groundwater plume, and borings ST-3, ST-4 and ST-5 were completed within the JCI groundwater plume. One soil boring from each plume area was also pre-selected for grab-groundwater sampling and analysis (borings ST-2 and ST-3).

Based on 2014 (first half) groundwater monitoring data from the JCI site (*JCI Jones Chemicals, Inc., Semiannual Groundwater Monitoring Report, February 1, 2014 through July 31, 2014, Former JCI Jones Chemicals Facility, 985 Montague Expressway, Milpitas, California*, dated August 29, 2014), shallow monitoring wells B17, B19 and B59, located in the vicinity of borings ST-4 and ST-5, contained PCE concentrations ranging from 1.4 micrograms per liter (µg/L) to 1,400 µg/L, and TCE concentrations ranging from 4.2 µg/L to 96 µg/L during the first half of 2014.

Based on 2014 (first half) groundwater monitoring data for the GWCC site (*Groundwater Monitoring Report for the Semiannual Period from January 1 through June 30, 2014, Former Great Western Chemical Company Facility, Milpitas, California*, dated July 30, 2014), TCE was detected in shallow groundwater at concentrations ranging from 5.7 to 64 µg/L in onsite groundwater monitoring wells, and from 1.7 to 8.5 µg/L in offsite intermediate (40-70 feet bgs) groundwater monitoring wells that are located within the project boundaries and associated with the GWCC plume. Off-site shallow groundwater monitoring wells were not sampled during this time frame.

Tetra Tech hired a private utility clearance contractor to clear the proposed soil boring locations prior to drilling. No utility conflicts were encountered.

Results of the soil and groundwater sampling are presented in the following sections.

2.0 SOIL AND GROUNDWATER SAMPLING

2.1 DEPTH TO GROUNDWATER

A saturated zone was encountered from 15.5 feet bgs to 19 feet bgs in soil boring ST-3, returning to slightly moist soil conditions from 19 feet to 20 feet bgs. Upon removal of the drilling rods, the groundwater level rose to 13 feet below grade at boring ST-3. Similarly, groundwater entered the other four soil boings upon removal of the drill rods, rising to a depth of 11 feet bgs at location ST-2. Minimal water (< 1 foot) had accumulated at the base of the other borings (ST-1, ST-4 and ST-5) in the approximate 15 minutes they remained open before being abandoned.

Based on 2011 monitoring well network data for the GWCC site, the average depth to water in the area was 7.2 feet bgs. Based on 2004 monitoring well network data for the JCI site, the average depth to water in the area was 12.1 feet bgs.

2.2 GROUNDWATER FLOW DIRECTION

Not determined, but known to flow in a west-northwest direction, based on the GWCC and JCI monitoring well networks.

2.3 BORINGS COMPLETED

Five borings (ST-1 through ST-5), as shown on Figure 1 and Figure 2 were advanced. Boring ST-1 is located directly downgradient from the GCCW release site, while boring ST-2 is located closer to the southern edge of the GCCW plume. Likewise, boring ST-4 is located immediately adjacent to, and downgradient of, the JCI release site, and borings ST-3 and ST-5 are located nearer to the northern and southern extents of the JCI plume, respectively. These locations were chosen with the intention of sampling: (1) where contamination would potentially be the highest based on proximity to the release sites, as well as (2) closer to the boundary of the suspected plumes to help identify uniformity of any soil contamination that exists.

2.4 DATE OF WORK

December 29, 2014.

2.5 DRILLING METHOD

The soil borings were completed using a Strataprobe direct-push drill rig operated by TEG of Northern California. Each soil boring was abandoned using neat cement grout, prepared with the equipment decontamination water.

2.6 BORING PERMIT

Boring Permits are not required in Santa Clara County for soil borings completed to depths of less than 45 feet bgs.

2.7 SOIL SAMPLING METHOD

A 2.5-inch outside diameter by 48-inch long, dual-tube macro-core barrel was used for obtaining continuous core soil samples to total depth. Core samples were obtained in 48-inch long acetate liners; a new liner was used for each 48-inch drive. The acetate tube section containing the selected soil sample was cut from the tube, capped, labeled and placed on ice in a cooler. Upon completing each boring, the soil samples were hand-delivered to TEG's mobile laboratory that was stationed between borings ST-1 and ST-2.

2.8 LITHOLOGY

Continuous soil cores were collected to total depth in each boring (approximately 20 feet bgs). The lithology encountered generally consists of alternating sequences of fine-grained clayey silt and silty clay, with gravelly sands encountered between 7 and 11 feet in depth at borings ST-4 and ST-5. This gravelly sand zone can be seen outcropping on the creek bank adjacent to each of these soil borings. Soil drilling logs are presented in Appendix A.

2.9 FIELD SCREENING

A MiniRAE 3000 PID (photo-ionizing detector) was used for field screening the soil cores at 4-foot intervals. A portion of soil from each interval was placed in a Ziploc bag and allowed to sit in the sun for 5-10 minutes before screening with the PID. Positive PID readings were detected at each depth interval, but at very low concentrations (typically below 5 ppmv), with the highest reading detected at 12 feet bgs at boring ST-4 (7.7 ppmv). No field indication of soil impacts (odor and/or soil discoloration) were noted in the soil borings.

2.10 GROUNDWATER SAMPLING METHOD

New temporary 1-inch diameter PVC well casing fitted with a 5-foot section of new well screen (0.020-inch slot size) was inserted downhole upon reaching 20-feet in depth, and removing the drill rods. New ¼-inch diameter polyethylene tubing equipped with a stainless steel re-usable foot valve was inserted to total depth, and a grab groundwater sample was collected. The sample was placed in laboratory-supplied, HCl preserved, VOA vials, labeled, and placed on ice in a cooler. The groundwater samples from ST-2 and ST-3 were hand-delivered to TEG's mobile laboratory.

2.11 SOIL CUTTINGS/DECON WATER

Minimal soil cuttings were generated during the investigation activities and were placed on the ground adjacent to each boring. The drill rod and foot valves were washed in a water/liquinox solution between borings, and rinsed with clean water. The decon water was used to mix the grout to abandon each boring.

2.12 FIELD INVESTIGATION SUMMARY TABLE

Boring ID	Total Depth (feet)	Soil Sample Depth (feet)	Soil Sample Analyzed	Groundwater Sample Analyzed	PID Field Screening (ppmv)
ST-1	20	4.75-5 9.75-10 14.75-15 19.75-20	YES YES YES YES	NO	0.0 (4') 0.4 (8') 1.2 (12') 0.7 (16') 0.0 (20')
ST-2	20	4.75-5 9.75-10 14.75-15 19.75-20	YES YES YES YES	YES	2.4 (4') 3.1 (8') 1.2 (12') 0.7(16') 0.8 (20')
ST-3	20	4.75-5 9.75-10 14.75-15 19.75-20	YES YES YES YES	YES	0.1 (4') 0.0 (8') 0.4 (12') 0.5 (16') 0.5 (20')
ST-4	20	4.75-5 9.75-10 14.75-15 19.75-20	YES YES YES YES	NO	2.2 (4') 1.8 (8') 7.7 (12') 0.5 (16') 4.7 (20')
ST-5	20	4.75-5 9.75-10 14.75-15 19.75-20	YES YES YES YES	NO	0.0 (4') 0.0 (8') 0.0 (12') 0.7 (16') 0.0 (20')

PID – Photo-ionizing Detector (MiniRAE 3000).

2.13 LABORATORY ANALYSES

Soil:

- VOCs by EPA Method 8260B. Analysis performed on-site by a mobile lab operated by TEG of Northern California. Results are summarized in Table 1.

Water:

- VOCs by EPA Method 8260B. Analysis performed by TEG's mobile lab, at their office in Rancho Cordova, California. Results are summarized in Table 2.

Copies of laboratory analytical laboratory data sheets and chain-of-custody forms are presented in Appendix B. Review of the laboratory analytical data sheets indicate all samples were analyzed at a dilution factor of 1 (no dilution), no chemicals were detected in the respective instrument blanks for soil and water analyses, and the laboratory QA/AC data are within acceptable limits.

3.0 ANALYTICAL RESULTS

This Section presents the laboratory analytical results associated with the soil and groundwater samples that were collected from the GWCC and JCI Plume Areas. Comparison of these analytical results to commonly used risk screening levels is discussed in Section 3.3.

3.1 GWCC AREA

3.1.1 GWCC Plume Area Soil Analytical Results

As discussed in Section 2.0 and associated subsections, soil boreholes ST-1 and ST-2 were advanced to approximately 20 feet bgs in the GWCC Plume Area (Figure 1), and sampled at approximately 5, 10, 15, and 20 feet bgs for VOCs by EPA Method 8260 B.

The soil analytical results associated with borehole ST-1 are summarized in Table 1 and below:

- TCE was detected at concentrations ranging from 5.0 to 19 ug/Kg in the soil samples collected from 10 (duplicate sample only) to 20 feet bgs. TCE was not detected (ND) above the laboratory reporting limit of 5 ug/kg in the soil sample collected from borehole ST-1 at 5 feet bgs;

- PCE was detected in the duplicate soil sample collected from 10 feet bgs and the soil samples collected from 15 and 20 feet bgs at concentrations ranging from 5.3 to 14 ug/kg. PCE was ND in the soil samples collected from borehole ST-1 at 5 feet bgs and 10 feet bgs (primary sample only);

- Cis-1,2-DCE was detected at a concentration of 5.4 ug/kg in the soil sample collected at 15 feet bgs. Cis-1,2-DCE was ND in all other samples collected from borehole ST-1; and

- In all other cases, VOCs were ND in the soil samples collected from borehole ST-1.

As summarized in Table 1, all VOCs were ND in all soil samples collected from borehole ST-2.

3.1.2 GWCC Plume Area Groundwater Analytical Results

As discussed in Section 2.0 and associated subsections, a groundwater samples was collected from borehole ST-2 and analyzed for VOCs by EPA Method 8260B. TCE (1.3 ug/L), m,p-xylene 2.0 (ug/L), o-xylene (1.2 ug/L, and 1,2,4-trimethylbenzene (1.1 ug/L) were detected in the groundwater sample collected from borehole ST-2. All other VOCs were ND in the groundwater sample collected from borehole ST-2.

3.2 JCI AREA

3.2.1 JCI Plume Area Soil Analytical Results

As discussed in Section 2.0 and associated subsections, soil boreholes ST-3 through ST-5 were advanced to approximately 20 feet bgs in the JCI Plume Area (Figure 2), and sampled at approximately 5, 10, 15, and 20 feet bgs for VOCs by EPA Method 8260 B.
The soil analytical results associated with borehole ST-3 are summarized in Table 1 and below:

- TCE was detected at a concentration of 8.9 ug/Kg in the soil sample collected from 20 feet bgs. TCE was ND in the all other soil sample collected from borehole ST-3;

- PCE was detected at a concentration of 9.1 ug/Kg in the soil sample collected from 20 feet bgs. PCE was ND in the all other soil sample collected from borehole ST-3; and

- In all other cases, VOCs were ND in the soil samples collected from borehole ST-1.

The soil analytical results associated with borehole ST-4 are summarized in Table 1 and below:

- TCE was detected at concentrations ranging from 17 ug/Kg to 84 ug/kg in the soil samples collected from 10 to 20 feet bgs. TCE was ND in the soil sample collected from borehole ST-4 at 5 feet bgs;

- PCE was detected in the soil samples collected from 5 to 15 feet bgs at concentrations ranging from 21 to 150 ug/kg, and 1,800 ug/kg in the soil sample collected at 20 feet bgs;

- 1,1-DCE was detected at a concentration of 8.4 ug/kg in the soil sample collected at 20 feet bgs. 1,1-DCE was ND in all other samples collected from borehole ST-4; and

- In all other cases, VOCs were ND in the soil samples collected from borehole ST-4.

As summarized in Table 1, PCE was detected in was detected in the 20-foot soil sample collected from borehole ST-5 at a concentration 10 ug/kg. In all other cases, VOCs were ND in the soil samples collected from borehole ST-5.

3.2.2 JCI Plume Area Groundwater Analytical Results

As discussed in Section 2.0 and associated subsections, a groundwater sample was collected from borehole ST-3 and analyzed for VOCs by EPA Method 8260B. TCE (5.6 ug/L) and PCE (3.0 ug/L) were detected in the groundwater sample collected from borehole ST-3. All other VOCs were ND in the groundwater sample collected from borehole ST-3.

4.0 EVALUATION OF RESULTS

In anticipation of future soil moving and dewatering (if needed) associated with the upcoming implementation of the Project, Tetra Tech collected soil and ground water samples within the areas where the JCI and GWCC groundwater contaminant plumes intersect the Project Area. The purpose of this work was to assist in the evaluation of the following:

- Whether the San Francisco Regional Water Quality Control Board (SFRWQCB) would be likely to determine that the soils that will be excavated during Project implementation from the JCI and GWCC plume areas will be suitable for reuse within the Project Area;
- Whether soils that will be excavated during Project implementation from the JCI and GWCC plume areas would exceed regulatory thresholds for characteristic hazardous waste; and
- Whether contaminated groundwater that will be removed during Project dewatering would likely be required by the regulatory agencies to be treated prior to discharge.

4.1 SELECTION OF SCREENING CRITERIA

4.1.1 Soil Screening Criteria

There are no regulatory thresholds that directly apply to determining whether excavated contaminated soil is suitable for onsite reuse. In the absence of directly applicable regulatory thresholds, Tetra Tech compared the soil analytical data to SFRWQCB Environmental Screening Levels (ESLs) and USEPA Region 9 Regional Screening Levels (RSLs) to evaluate the potential of whether excavated contaminated soil will likely be suitable for onsite reuse. Based on professional experience, regulatory agencies are likely to allow the reuse of excavated soil if contaminant concentrations are below appropriate screening levels.

The RSLs and ESLs are described in further detail below. It is noted that neither of these screening levels are directly applicable to this particular project; however each provide conservative regulatory-derived risk-based values that can be used as an indication as to whether or not reusing the excavated soil would present significant health or environmental risks.

<u>USEPA Region 9 Regional Screening Levels</u>

USEPA Region 9 RSLs were developed using risk assessment guidance from the EPA Superfund program. The EPA considers SLs to be protective for humans (including sensitive groups) over a lifetime; however, SLs are not always applicable to a particular site and do not address non-human health endpoints, such as ecological impacts. The published RSLs are generic; they are calculated without site-specific information and may be re-calculated using site-specific data. RSLs address specific media and concerns, including: soil, air, tap water, and the protection of groundwater.

RSLs are used for site "screening" and as initial cleanup goals, if applicable. SLs are not de facto cleanup standards and should not be applied as such. The SL's role in site "screening" is to help identify areas, contaminants, and conditions that require further federal attention at a particular site. Generally, at sites where contaminant concentrations fall below SLs, no further action or study is warranted under the Superfund program, so long as the exposure assumptions at a site match those taken into account by the SL calculations. Chemical concentrations above the RSL would not automatically designate a site as "dirty" or trigger a response action; however, exceeding a RSL suggests that further evaluation of the potential risks by site contaminants is appropriate. SLs are also useful tools for identifying initial cleanup goals at a site. RSLs provide long-term targets to use during the analysis of different remedial alternatives.

ESLs

The ESLs, which are prepared by staff of the SFRWQCB, provide conservative screening levels for over 100 chemicals commonly found at sites with contaminated soil and groundwater. They are intended to help expedite the identification and evaluation of potential environmental concerns at contaminated sites. ESLs address a range of media (soil, groundwater, soil gas, and indoor air) and a range of concerns (e.g., impacts to drinking water, vapor intrusion, and impacts to aquatic life).

The ESLs allow dischargers and regulators in the San Francisco Bay region to quickly focus on the most significant problems at contaminated sites. The ESLs are considered to be protective for typical bay area sites. Under most circumstances, and within the limitations described, the presence of a chemical in soil, soil gas, or groundwater at concentrations below the corresponding ESL can be assumed to not pose a significant threat to human health, water resources, or the environment.

The ESLs utilized for this project pertain to shallow soils of depths less than three meters. This would include surficial (cover) and subsurface (fill) soils.

4.1.2 Groundwater Screening Criteria

Groundwater concentrations were compared to maximum contaminant levels (MCLs) and groundwater ESLs. It is expected that if groundwater is extracted during the Project, the discharged water will have to meet the MCLs and/or ESLs. Thus comparison to the MCLS and ESLs provides insight as to whether or not groundwater treatment would be required prior to discharge.

4.2 COMPARISON OF SOIL ANALYTICAL DATA TO ESLS AND RSLS

The maximum depth of excavation during Project Implementation will be approximately 15 feet below ground surface. A total of 17 soil samples (including 2 duplicates) were collected from the upper 15 feet of the soil column (ST-1-5', 10', 10'D, 15'; ST-2-5', 10', 15'; ST-3-5', 10', 15'; ST-4-5', 10', 15'; ST-4-5', 10', 15'; ST-5-5', 10', 15', and 15'D). The only VOCs detected in these soil samples were 1,1-DCE, cis-1,2-DCE, TCE, PCE. As summarized below and in Table 1, none of the VOCs exceeded screening levels in the upper 15 feet (the maximum excavation depth):

- 1,1-DCE was detected at maximum concentration of 8.4 ug/kg in the upper 15 feet (maximum excavation depth), well below the residential ESL of 1,000 ug/kg and the RSL of 23,000 ug/kg;

- Cis-1,2-DCE was detected at maximum concentration of 5.4 ug/kg in the upper 15 feet (maximum excavation depth), well below the residential ESL of 190 ug/kg and the RSL of 16,000 ug/kg; and

- TCE was detected at maximum concentration of 19 ug/kg in the upper 15 feet (maximum excavation depth), well below the residential ESL of 460ug/kg and the RSL of 8,100 ug/kg.

PCE was detected at maximum concentration of 150 ug/kg in the upper 15 feet (maximum excavation depth), well below the residential ESL of 550 ug/kg and the RSL of 550 ug/kg.

4.3 POTENTIAL WASTE CLASSIFICATION

Based on a review of the available data and comparison to the risk screening levels, the excavated soil would not be classified as a hazardous waste.

4.4 GROUNDWATER

PCE and TCE concentrations detected in groundwater samples ranged from less than 1.0 (detection limit) to 3.0 µg/L, and 1.3 to 5.6 µg/L, respectively. The TCE concentration exceeded the California and USEPA MCL of 5.0 µg/L.

5.0 CONCLUSIONS

Based on the available data, Tetra Tech concludes the following:

- The VOC concentrations detected in the upper 15 feet of soil are less than risk-based screening criteria applied by the SFRWQCB and the USEPA. Although these screening criteria are not directly applicable to reuse of excavated soil, Tetra Tech concludes that the reuse of the soils would not present an unacceptable human health or environmental risk, and therefore would be appropriate;

- Soil transported offsite for disposal would be classified as non-hazardous; and

- Dewatering, if necessary, would require treatment prior to discharge.

FIGURES

SOURCE: ***Google Earth Pro, February 23, 2014.***

ST-1 ● Soil boring location (Tetra Tech, 12/29/14)

Known VOC Groundwater Plume (approximate extent) – Great Western Chemical Company (GWCC)

-N-

0 feet 150

TITLE:

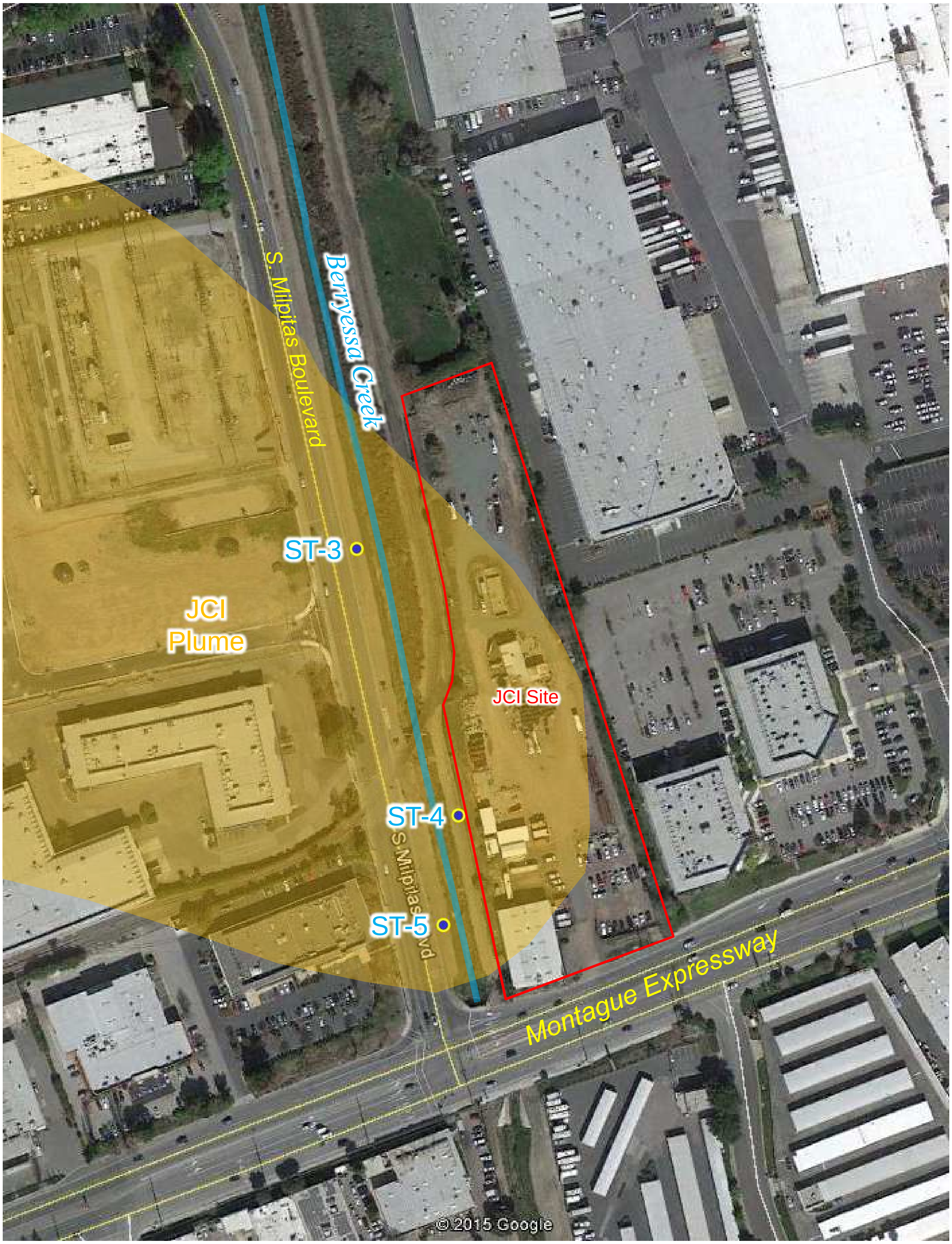
Soil Boring Locations

LOCATION:

Upper Berryessa Creek FRMP
Between Montague Expressway and Yosemite Drive
Milpitas, California

TETRA TECH

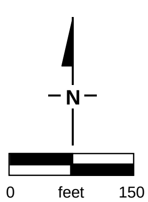
CHECKED:	IA	**FIGURE:**
DRAFTED:	KDH	**1**
FILE:	100-SWW-T31331	
DATE:	01-14-15	



SOURCE: ***Google Earth Pro, February 23, 2014.***

ST-3 ● Soil boring location (Tetra Tech, 12/29/14)

Known VOC Groundwater Plume (approximate extent) – Jones Chemicals, Inc. (JCI)



TITLE:	**Soil Boring Locations**
LOCATION:	**Upper Berryessa Creek FRMP Between Montague Expressway and Yosemite Drive Milpitas, California**

TETRA TECH	CHECKED:	IA	FIGURE:
	DRAFTED:	KDH	**2**
	FILE:	100-SWW-T31331	
	DATE:	01-14-15	

TABLES

TABLE 1

Analytical Results Summary - Soil
Upper Berreyssa Creek FRMP
Between Montague Expressway and Yosemite Drive
Milpitas, California

Sample Location	Date Sampled	Depth (feet, bgs)	VOCs - EPA 8260B (µg/Kg)						
			1,1-DCE	cis-1,2-DCE	TCE	PCE	m,p-Xylene (1)	o-Xylene (1)	1,2,4-TMB (1)
ST-1-5'	12/29/2014	5	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
ST-1-10'	12/29/2014	10	< 5.0	< 5.0	**5.0**	< 5.0	< 5.0	< 5.0	< 5.0
ST-1-10'D	12/29/2014	10	< 5.0	< 5.0	**8.1**	**5.3**	< 5.0	< 5.0	< 5.0
ST-1-15'	12/29/2014	15	< 5.0	**5.4**	**17**	**11**	< 5.0	< 5.0	< 5.0
ST-1-20'	12/29/2014	20	< 5.0	< 5.0	**19**	**14**	< 5.0	< 5.0	< 5.0
ST-2-5'	12/29/2014	5	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
ST-2-10'	12/29/2014	10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
ST-2-15'	12/29/2014	15	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
ST-2-20'	12/29/2014	20	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
ST-3-5'	12/29/2014	5	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
ST-3-10'	12/29/2014	10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
ST-3-15'	12/29/2014	15	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
ST-3-20'	12/29/2014	20	< 5.0	< 5.0	**8.9**	**9.1**	< 5.0	< 5.0	< 5.0
ST-4-5'	12/29/2014	5	< 5.0	< 5.0	< 5.0	**21**	< 5.0	< 5.0	< 5.0
ST-4-10'	12/29/2014	10	< 5.0	< 5.0	**17**	**150**	< 5.0	< 5.0	< 5.0
ST-4-15'	12/29/2014	15	< 5.0	< 5.0	**19**	**150**	< 5.0	< 5.0	< 5.0
ST-4-20'	12/29/2014	20	**8.4**	< 5.0	**84**	**1,800**	< 5.0	< 5.0	< 5.0

TABLE 1

Analytical Results Summary - Soil
Upper Berreyssa Creek FRMP
Between Montague Expressway and Yosemite Drive
Milpitas, California

Sample Location	Date Sampled	Depth (feet, bgs)	VOCs - EPA 8260B (µg/Kg)						
			1,1-DCE	cis-1,2-DCE	TCE	PCE	m,p-Xylene (1)	o-Xylene (1)	1,2,4-TMB (1)
ST-5-5'	12/29/2014	5	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
ST-5-10'	12/29/2014	10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
ST-5-15'	12/29/2014	15	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
ST-5-15'D	12/29/2014	15	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
ST-5-20'	12/29/2014	20	< 5.0	< 5.0	< 5.0	**10**	< 5.0	< 5.0	< 5.0
ESL - Residential (< 3m)			1,000	190	460	550	2,300	2,300	NV
RSL - Residential			23,000	16,000	410	8,100	55,000	65,000	5,800
TTLC			NV	NV	2,040,000	NV	NV	NV	NV

Notes:

VOCs	Volatile organic compounds. Analyzed by EPA Method 8260B (TEG-Northern California Mobile Lab)
µg/Kg	micrograms per kilogram or parts per billion (ppb).
D	Duplicate sample
DCE	Dichloroethene
TCE	Trichloroethene
PCE	Tetrachloroethene
TMB	Trimethylbenzene
(1)	Only detected in grab-groundwater samples.
Bold Value	Detected above the laboratory reporting limit.
	Shaded value exceeds screening level and/or regulatory action level.
ESL (<3 m)	Environmental Screening Level, Regional Water Quality Control Board, Table A, Shallow Soil Screening Levels (<3m bgs); Commerical and Residential Land Use (groundwater is current or potential drinking water source), December 2013.
ESL (>3 m)	Environmental Screening Level, Regional Water Quality Control Board, Table C, Shallow Soil Screening Levels (>3m bgs); Commerical and Residential Land Use (groundwater is current or potential drinking water source), December 2013.
Groundwater Protection ESL	Environmental Screening Level, Regional Water Quality Control Board, Table G, Soil Screening Levels for Leaching Concerns, December 2013.
RSL	United States Environmental Protection Agency, Regional Screening Level - Summary Table, January 2015.
TTLC	California Title 22, classification as a hazardous waste, if trasported off-site.
NV	No Value

TABLE 2

Analytical Results Summary - Water
Upper Berreyssa Creek FRMP
Between Montague Expressway and Yosemite Drive
Milpitas, California

			VOCs - EPA 8260B (µg/L)						
Boring	**Depth (feet, bgs)**	**Date**	**1,1-DCE**	**cis-1,2-DCE**	**TCE**	**PCE**	**m,p-Xylene**	**o-Xylene**	**1,2,4-TMB**
ST-2-W	11-20	12/29/2014	< 1.0	< 1.0	**1.3**	< 1.0	**2.0**	**1.2**	**1.1**
ST-3-W	13-20	12/29/2014	< 1.0	< 1.0	**5.6**	**3.0**	< 1.0	< 1.0	< 1.0
	ESL		6	6	5	5	20	20	NV
	MCL		6	6	5	5	1,750	1,750	330 (1)

Notes:

Groundwater samples are unfiltered, grab-groundwater samples from a direct-push borehole. Collected through temporary PVC well screen and casing.

VOCs	Volatile organic compounds. Analyzed by EPA Method 8260B (TEG-Northern California Mobile Lab).
µg/L	micrograms per liter or parts per billion (ppb).
DCE	Dichloroethene
TCE	Trichloroethene
PCE	Tetrachloroethene
TMB	Trimethylbenzene
Bold Value	Detected above the laboratory reporting limit.
	Shaded value exceeds screening level and/or regulatory action level.
ESL	RWQCB - San Francisco Environmental Screening Level. Groundwater Screening Levels, Table F-1a (groundwater is a current or potential drinking water resource), December 2013.
MCL	Maximum Containment Level (California primary drinking water standard), Title 22, California Code of Regulations. On-line database, searched 1/14/15.
(1)	No published MCL value. Value represents California Department of Public Heath Notification Level.
NV	No Value

APPENDIX A

Soil Drilling Logs

TETRA TECH

BORING LOG

PROJECT NUMBER	100-SWW-T31331 Task 3.62	**BORING/WELL NUMBER**	ST-1
PROJECT NAME	Upper Berryessa Creek FRMP	**DATE DRILLING BEGAN**	12/29/2014
LOCATION	Milpitas, CA	**DATE DRILLING ENDED**	12/29/2014
DRILLING METHOD	Strataprobe Direct Push	**NORTHING [CA STATE PLANE ZONE III (NAD 83)]**	
SAMPLING METHOD	Continuous Core, 2" Diameter	**EASTING [CA STATE PLANE ZONE III (NAD 83)]**	
DEPTH TO SATURATED SOIL (ft)		**GROUND SURFACE ELEVATION (ft, NAVD 88)**	42'(ST-1)-63'(ST-5)
LOGGED BY	Keith Hoofard	**REMARKS**	

PID (ppm)	BLOW COUNTS	RECOVERY (ft)	SAMPLE ID.	SAMPLE DEPTH	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (Percent Gravel, Sand, Silt, Clay)
						ML		0-7' **CLAYEY SILT (ML):** (0,5,70,25); Dark gray (7.5YR 4/1); very fine sand; slight plasticity; stiff; slightly moist.
0.0			ST-1-5'		5			
0.4						CL		7-14.5' **SILTY CLAY (CL):** (0,5,35,60); Dark brown (7.5YR 3/2); very fine sand; slight plasticity; soft; slightly moist.
			ST-1-10'		10			
1.2								@12' - Increasing plasticity - low to medium; firm to stiff.
			ST-1-15'		15	ML		14.5-17' **CLAYEY SILT w/ SAND (ML):** (0,10,60,30); Dark yellowish brown (10YR 4/4); very fine sand; slight plasticity; firm; moist.
0.7								
						CL		17-20' **SILTY CLAY (CL):** (0,5,40,55); Dark yellowish brown (10YR 4/4); very fine sand; low plasticity; stiff; moist.
0.0			ST-1-20'		20			Note: Saturated soil conditions not encountered. Groundwater entered borehole after removing drill rods, reaching 19 feet bgs before abandoning borehole.

TT GEO TT-DIV - UPPER BERRYESSA CREEK FRM.GPJ LAEWNN01.GDT 1/16/15

Keith Hoofard

Name of Geologist

Name of Reviewer

TETRA TECH

BORING LOG

PROJECT NUMBER 100-SWW-T31331 Task 3.62
PROJECT NAME Upper Berryessa Creek FRMP
LOCATION Milpitas, CA
DRILLING METHOD Strataprobe Direct Push
SAMPLING METHOD Continuous Core, 2" Diameter
DEPTH TO SATURATED SOIL (ft)
LOGGED BY Keith Hoofard

BORING/WELL NUMBER ST-2
DATE DRILLING BEGAN 12/29/2014
DATE DRILLING ENDED 12/29/2014
NORTHING [CA STATE PLANE ZONE III (NAD 83)]
EASTING [CA STATE PLANE ZONE III (NAD 83)]
GROUND SURFACE ELEVATION (ft, NAVD 88) 42'(ST-1)-63'(ST-5)
REMARKS

PID (ppm)	BLOW COUNTS	RECOVERY (ft)	SAMPLE ID.	SAMPLE DEPTH	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (Percent Gravel, Sand, Silt, Clay)
2.4			ST-2-5'		5	ML		0-6' **CLAYEY SILT (ML):** (0,5,70,25); Dark gray (7.5YR 4/1); very fine sand; slight plasticity; stiff; slightly moist.
3.1			ST-2-10'		10	CL		6-13' **SILTY CLAY (CL):** (0,5,35,60); Dark brown (7.5YR 3/2); very fine sand; slight plasticity; soft; slightly moist.
1.2								
0.7			ST-2-15'		15	CL		13-18' **SILTY CLAY w/ SAND (CL):** (0,15,30,55); Yellowish brown (10YR 5/4); fine sand; low plasticity; firm; slightly moist to moist.
						SM		18-20' **SILTY SAND (SM):** (0,65,35,0); Yellowish brown (10YR 5/4); fine sand; loose; moist to very moist.
0.8			ST-2-20'		20			Note: Saturated soil conditions not encountered. Groundwater entered borehole after removing drill rods, reaching 11 feet bgs before abandoning borehole.

TT GEO TT-DIV - UPPER BERRYESSA CREEK FRM.GPJ LAEWNN01.GDT 1/16/15

Keith Hoofard

Name of Geologist

Name of Reviewer

TETRA TECH

BORING LOG

PROJECT NUMBER	100-SWW-T31331 Task 3.62	BORING/WELL NUMBER	ST-3
PROJECT NAME	Upper Berryessa Creek FRMP	DATE DRILLING BEGAN	12/29/2014
LOCATION	Milpitas, CA	DATE DRILLING ENDED	12/29/2014
DRILLING METHOD	Strataprobe Direct Push	NORTHING [CA STATE PLANE ZONE III (NAD 83)]	
SAMPLING METHOD	Continuous Core, 2" Diameter	EASTING [CA STATE PLANE ZONE III (NAD 83)]	
DEPTH TO SATURATED SOIL (ft)	15.5	GROUND SURFACE ELEVATION (ft, NAVD 88)	42'(ST-1)-63'(ST-5)
LOGGED BY	Keith Hoofard	REMARKS	

PID (ppm)	BLOW COUNTS	RECOVERY (ft)	SAMPLE ID.	SAMPLE DEPTH	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (Percent Gravel, Sand, Silt, Clay)
0.1			ST-3-5'		5	ML		0-5' **CLAYEY SILT (ML):** (0,5,70,25); Very dark gray (10YR 3/1); no plasticity; firm to stiff; slightly moist.
0.0			ST-3-10'		10	ML		5-9.5' **SANDY SILT (ML):** (0,40,60,0); Dark yellowish brown (10YR 4/4); fine sand; soft; slightly moist.
0.4			ST-3-15'		15	CL		9.5-15.5' **SILTY CLAY (CL):** (0,5,45,50); Dark grayish brown (10YR 4/2); low plasticity; firm; slightly moist.
0.5						SC		15.5-19' **CLAYEY SAND (SC):** (0,70,5,25); Dark yellowish brown (10YR 4/4); fine to medium sand; saturated.
0.5			ST-3-20'		20	CL		19-20' **SILTY CLAY (CL):** (0,0,45,55); Dark yellowish brown (10YR 4/4); low to medium plasticity; firm; slightly moist.
								Note: Groundwater level rose to 13 feet bgs after removing drill rods.

TT GEO TT-DIV - UPPER BERRYESSA CREEK FRM.GPJ LAEWNN01.GDT 1/16/15

Keith Hoofard

Name of Geologist

Name of Reviewer

TETRA TECH

BORING LOG

PROJECT NUMBER	100-SWW-T31331 Task 3.62	**BORING/WELL NUMBER**	ST-4
PROJECT NAME	Upper Berryessa Creek FRMP	**DATE DRILLING BEGAN**	12/29/2014
LOCATION	Milpitas, CA	**DATE DRILLING ENDED**	12/29/2014
DRILLING METHOD	Strataprobe Direct Push	**NORTHING [CA STATE PLANE ZONE III (NAD 83)]**	
SAMPLING METHOD	Continuous Core, 2" Diameter	**EASTING [CA STATE PLANE ZONE III (NAD 83)]**	
DEPTH TO SATURATED SOIL (ft)		**GROUND SURFACE ELEVATION (ft, NAVD 88)**	42'(ST-1)-63'(ST-5)
LOGGED BY	Keith Hoofard	**REMARKS**	

PID (ppm)	BLOW COUNTS	RECOVERY (ft)	SAMPLE ID.	SAMPLE DEPTH	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (Percent Gravel, Sand, Silt, Clay)
						ML		0-2' **SILT w/ GRAVEL (ML):** (<5,10,90,0); Dark yellowish brown (10YR 34/4); trace angular gravels.
2.2			ST-4-5'		5	ML		2-7' **CLAYEY SILT (ML):** (0,5,70,25); Brown (10YR 4/3); very fine sand; slight plasticity; firm; slightly moist.
1.8			ST-4-10'		10	SW GW		7-11' **GRAVELLY SAND (SW/GW):** (40,55,5,0); Dark yellowish brown (10YR 4/4); fine to coarse, sub-angular to sub-rounded gravel; fine to coarse, sub-angular to sub-rounded sand; loose; slightly moist.
7.7						CL		11-20' **SILTY CLAY (CL):** (0,0,45,55); Brown (10YR 5/3); moderate plasticity; soft; slightly moist to moist.
0.5			ST-4-15'		15			
4.7			ST-4-20'		20			Note: Saturated soil conditions not encountered. Groundwater entered borehole after removing drill rods, reaching 19.5 feet bgs before abandoning borehole.

TT GEO TT-DIV - UPPER BERRYESSA CREEK FRM.GPJ LAEWNN01.GDT 1/16/15

Keith Hoofard

Name of Geologist

Name of Reviewer

BORING LOG

TETRA TECH

PROJECT NUMBER	100-SWW-T31331 Task 3.62	**BORING/WELL NUMBER**	ST-5
PROJECT NAME	Upper Berryessa Creek FRMP	**DATE DRILLING BEGAN**	12/29/2014
LOCATION	Milpitas, CA	**DATE DRILLING ENDED**	12/29/2014
DRILLING METHOD	Strataprobe Direct Push	**NORTHING [CA STATE PLANE ZONE III (NAD 83)]**	
SAMPLING METHOD	Continuous Core, 2" Diameter	**EASTING [CA STATE PLANE ZONE III (NAD 83)]**	
DEPTH TO SATURATED SOIL (ft)		**GROUND SURFACE ELEVATION (ft, NAVD 88)**	42'(ST-1)-63'(ST-5)
LOGGED BY	Keith Hoofard	**REMARKS**	

PID (ppm)	BLOW COUNTS	RECOVERY (ft)	SAMPLE ID.	SAMPLE DEPTH	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (Percent Gravel, Sand, Silt, Clay)
						ML		0-2' **SILT (ML):** (0,10,90,0); Dark yellowish brown (10YR 34/4); very fine sand; slightly moist.
0.0			ST-5-5'		5	ML		2-8' **CLAYEY SILT (ML):** (0,5,70,25); Brown (10YR 4/3); very fine sand; slight plasticity; firm; slightly moist.
0.0			ST-5-10'		10	SW GW		8-11' **GRAVELLY SAND (SW/GW):** (40,55,5,0); Dark yellowish brown (10YR 4/4); fine to coarse, sub-angular to sub-rounded gravel; fine to coarse, sub-angular to sub-rounded sand; loose; slightly moist.
0.0			ST-5-15'		15	CL		11-19.5' **SILTY CLAY (CL):** (0,0,45,55); Brown (10YR 5/3); moderate plasticity; soft; slightly moist to moist.
0.0								@16' - Very fine sand (VFS).
0.0			ST-5-20'		20	SC		19.5-20' **CLAYEY SAND (SC):** (0,70,5,25); Dark yellowish brown (10YR 4/4); medium to coarse, sub angular sand; trace fine, sub rounded gravel; moist to very moist.

Note: Saturated soil conditions not encountered. Groundwater entered borehole after removing drill rods, reaching 20 feet bgs before abandoning borehole.

Keith Hoofard

Name of Geologist

Name of Reviewer

APPENDIX B

Laboratory Analytical Data Sheets and Chain of Custody Forms

TEG Northern California Inc.

14 January 2015

Mr. Ira Mark Artz
Tetra Tech - DIV
17885 Von Karman Avenue, Suite 500
Irvine, CA 92614-6213

SUBJECT: DATA REPORT - TetraTech – DIV Project # 100-SWW-T31331 Task 3.62
Berryessa Creek Channel, Milpitas, California

TEG Project # 41229F

Mr. Artz:

Please find enclosed a data report for the samples analyzed from the above referenced project for Tetra Tech - DIV. The samples were analyzed in TEG's mobile laboratory. TEG conducted a total of 24 analyses on 22 soil 2 water samples.

-- 2 analyses on waters for volatile organic hydrocarbons by EPA method 8260B.

-- 22 analyses on soils for volatile organic hydrocarbons by EPA method 8260B.

The results of the analyses are summarized in the enclosed tables. Applicable detection limits and QA/QC data are included in the tables.

TEG appreciates the opportunity to have provided analytical services to Tetra Tech - DIVon this project. If you have any further questions relating to these data or report, please do not hesitate to contact us.

Sincerely,

Mark Jerpbak
Director, TEG-Northern California

TEG Project #41229F

Tetra Tech - DIV Project # 100-SWW-T31331 Task 3.62
Berryessa Creek Channel, Milpitas, California

EPA Method 8260B Analyses of SOIL in ug/Kg

SAMPLE NUMBER:		Blank	Blank	ST-1-5'	ST-1-10'	ST-1-10' D	ST-1-15'
COLLECTION DATE:				12/29/14	12/29/14	12/29/14	12/29/14
ANALYSIS DATE:		12/29/14	12/30/14	12/30/14	12/30/14	12/30/14	12/30/14
DILUTION FACTOR:	RL	1	1	1	1	1	1
Dichlorodifluoromethane	5.0	nd	nd	nd	nd	nd	nd
Chloromethane	5.0	nd	nd	nd	nd	nd	nd
Vinyl Chloride	5.0	nd	nd	nd	nd	nd	nd
Bromomethane	5.0	nd	nd	nd	nd	nd	nd
Chloroethane	5.0	nd	nd	nd	nd	nd	nd
Trichlorofluoromethane	5.0	nd	nd	nd	nd	nd	nd
1,1-Dichloroethene	5.0	nd	nd	nd	nd	nd	nd
Methylene Chloride	5.0	nd	nd	nd	nd	nd	nd
trans-1,2-Dichloroethene	5.0	nd	nd	nd	nd	nd	nd
1,1-Dichloroethane	5.0	nd	nd	nd	nd	nd	nd
2,2-Dichloropropane	5.0	nd	nd	nd	nd	nd	nd
cis-1,2-Dichloroethene	5.0	nd	nd	nd	nd	nd	5.4
Chloroform	5.0	nd	nd	nd	nd	nd	nd
Bromochloromethane	5.0	nd	nd	nd	nd	nd	nd
1,1,1-Trichloroethane	5.0	nd	nd	nd	nd	nd	nd
1,1-Dichloropropene	5.0	nd	nd	nd	nd	nd	nd
Carbon Tetrachloride	5.0	nd	nd	nd	nd	nd	nd
1,2-Dichloroethane	5.0	nd	nd	nd	nd	nd	nd
Benzene	5.0	nd	nd	nd	nd	nd	nd
Trichloroethene	5.0	nd	nd	nd	5.0	8.1	17
1,2-Dichloropropane	5.0	nd	nd	nd	nd	nd	nd
Bromodichloromethane	5.0	nd	nd	nd	nd	nd	nd
Dibromomethane	5.0	nd	nd	nd	nd	nd	nd
cis-1,3-Dichloropropene	5.0	nd	nd	nd	nd	nd	nd
Toluene	5.0	nd	nd	nd	nd	nd	nd
trans-1,3-Dichloropropene	5.0	nd	nd	nd	nd	nd	nd
1,1,2-Trichloroethane	5.0	nd	nd	nd	nd	nd	nd
1,2-Dibromoethane	5.0	nd	nd	nd	nd	nd	nd
1,3-Dichloropropane	5.0	nd	nd	nd	nd	nd	nd
Tetrachloroethene	5.0	nd	nd	nd	nd	5.3	11
Dibromochloromethane	5.0	nd	nd	nd	nd	nd	nd
Chlorobenzene	5.0	nd	nd	nd	nd	nd	nd
Ethylbenzene	5.0	nd	nd	nd	nd	nd	nd
1,1,1,2-Tetrachloroethane	5.0	nd	nd	nd	nd	nd	nd
m,p-Xylene	5.0	nd	nd	nd	nd	nd	nd
o-Xylene	5.0	nd	nd	nd	nd	nd	nd
Styrene	5.0	nd	nd	nd	nd	nd	nd
Bromoform	5.0	nd	nd	nd	nd	nd	nd
Isopropylbenzene	5.0	nd	nd	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	5.0	nd	nd	nd	nd	nd	nd
1,2,3-Trichloropropane	5.0	nd	nd	nd	nd	nd	nd
n-propylbenzene	5.0	nd	nd	nd	nd	nd	nd
Bromobenzene	5.0	nd	nd	nd	nd	nd	nd
1,3,5-Trimethylbenzene	5.0	nd	nd	nd	nd	nd	nd
2-Chlorotoluene	5.0	nd	nd	nd	nd	nd	nd
4-Chlorotoluene	5.0	nd	nd	nd	nd	nd	nd
tert-Butylbenzene	5.0	nd	nd	nd	nd	nd	nd
1,2,4-Trimethylbenzene	5.0	nd	nd	nd	nd	nd	nd
sec-Butylbenzene	5.0	nd	nd	nd	nd	nd	nd
p-Isopropyltoluene	5.0	nd	nd	nd	nd	nd	nd
1,3-Dichlorobenzene	5.0	nd	nd	nd	nd	nd	nd
1,4-Dichlorobenzene	5.0	nd	nd	nd	nd	nd	nd
n-Butylbenzene	5.0	nd	nd	nd	nd	nd	nd
1,2-Dichlorobenzene	5.0	nd	nd	nd	nd	nd	nd
1,2-Dibromo-3-chloropropane	5.0	nd	nd	nd	nd	nd	nd
1,2,4-Trichlorobenzene	5.0	nd	nd	nd	nd	nd	nd
Hexachlorobutadiene	5.0	nd	nd	nd	nd	nd	nd
Naphthalene	5.0	nd	nd	nd	nd	nd	nd
1,2,3-Trichlorobenzene	5.0	nd	nd	nd	nd	nd	nd
Surrogate Recovery (1,2-DCA-d4)		84%	68%	80%	82%	93%	78%
Surrogate Recovery (Toluene-d8)		95%	87%	83%	85%	81%	81%
Surrogate Recovery (1,4-BFB)		105%	89%	94%	97%	96%	95%

'RL' Indicates reporting limit at a dilution factor of 1

'nd' Indicates not detected at listed reporting limits

Analyses performed by: Mr. Leif Jonsson

11350 Monier Park Place, Rancho Cordova, CA 95742 • Phone (916) 853-8010 • Fax (916) 853-8020

TEG Project #41229F

Tetra Tech - DIV Project # 100-SWW-T31331 Task 3.62
Berryessa Creek Channel, Milpitas, California

EPA Method 8260B Analyses of SOIL in ug/Kg

SAMPLE NUMBER:		ST-1-20'	ST-2-5'	ST-2-10'	ST-2-15'	ST-2-20'	ST-3-5'
COLLECTION DATE:		12/29/14	12/29/14	12/29/14	12/29/14	12/29/14	12/29/14
ANALYSIS DATE:		12/30/14	12/29/14	12/29/14	12/29/14	12/29/14	12/29/14
DILUTION FACTOR:	RL	1	1	1	1	1	1
Dichlorodifluoromethane	5.0	nd	nd	nd	nd	nd	nd
Chloromethane	5.0	nd	nd	nd	nd	nd	nd
Vinyl Chloride	5.0	nd	nd	nd	nd	nd	nd
Bromomethane	5.0	nd	nd	nd	nd	nd	nd
Chloroethane	5.0	nd	nd	nd	nd	nd	nd
Trichlorofluoromethane	5.0	nd	nd	nd	nd	nd	nd
1,1-Dichloroethene	5.0	nd	nd	nd	nd	nd	nd
Methylene Chloride	5.0	nd	nd	nd	nd	nd	nd
trans-1,2-Dichloroethene	5.0	nd	nd	nd	nd	nd	nd
1,1-Dichloroethane	5.0	nd	nd	nd	nd	nd	nd
2,2-Dichloropropane	5.0	nd	nd	nd	nd	nd	nd
cis-1,2-Dichloroethene	5.0	nd	nd	nd	nd	nd	nd
Chloroform	5.0	nd	nd	nd	nd	nd	nd
Bromochloromethane	5.0	nd	nd	nd	nd	nd	nd
1,1,1-Trichloroethane	5.0	nd	nd	nd	nd	nd	nd
1,1-Dichloropropene	5.0	nd	nd	nd	nd	nd	nd
Carbon Tetrachloride	5.0	nd	nd	nd	nd	nd	nd
1,2-Dichloroethane	5.0	nd	nd	nd	nd	nd	nd
Benzene	5.0	nd	nd	nd	nd	nd	nd
Trichloroethene	5.0	19	nd	nd	nd	nd	nd
1,2-Dichloropropane	5.0	nd	nd	nd	nd	nd	nd
Bromodichloromethane	5.0	nd	nd	nd	nd	nd	nd
Dibromomethane	5.0	nd	nd	nd	nd	nd	nd
cis-1,3-Dichloropropene	5.0	nd	nd	nd	nd	nd	nd
Toluene	5.0	nd	nd	nd	nd	nd	nd
trans-1,3-Dichloropropene	5.0	nd	nd	nd	nd	nd	nd
1,1,2-Trichloroethane	5.0	nd	nd	nd	nd	nd	nd
1,2-Dibromoethane	5.0	nd	nd	nd	nd	nd	nd
1,3-Dichloropropane	5.0	nd	nd	nd	nd	nd	nd
Tetrachloroethene	5.0	14	nd	nd	nd	nd	nd
Dibromochloromethane	5.0	nd	nd	nd	nd	nd	nd
Chlorobenzene	5.0	nd	nd	nd	nd	nd	nd
Ethylbenzene	5.0	nd	nd	nd	nd	nd	nd
1,1,1,2-Tetrachloroethane	5.0	nd	nd	nd	nd	nd	nd
m,p-Xylene	5.0	nd	nd	nd	nd	nd	nd
o-Xylene	5.0	nd	nd	nd	nd	nd	nd
Styrene	5.0	nd	nd	nd	nd	nd	nd
Bromoform	5.0	nd	nd	nd	nd	nd	nd
Isopropylbenzene	5.0	nd	nd	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	5.0	nd	nd	nd	nd	nd	nd
1,2,3-Trichloropropane	5.0	nd	nd	nd	nd	nd	nd
n-propylbenzene	5.0	nd	nd	nd	nd	nd	nd
Bromobenzene	5.0	nd	nd	nd	nd	nd	nd
1,3,5-Trimethylbenzene	5.0	nd	nd	nd	nd	nd	nd
2-Chlorotoluene	5.0	nd	nd	nd	nd	nd	nd
4-Chlorotoluene	5.0	nd	nd	nd	nd	nd	nd
tert-Butylbenzene	5.0	nd	nd	nd	nd	nd	nd
1,2,4-Trimethylbenzene	5.0	nd	nd	nd	nd	nd	nd
sec-Butylbenzene	5.0	nd	nd	nd	nd	nd	nd
p-Isopropyltoluene	5.0	nd	nd	nd	nd	nd	nd
1,3-Dichlorobenzene	5.0	nd	nd	nd	nd	nd	nd
1,4-Dichlorobenzene	5.0	nd	nd	nd	nd	nd	nd
n-Butylbenzene	5.0	nd	nd	nd	nd	nd	nd
1,2-Dichlorobenzene	5.0	nd	nd	nd	nd	nd	nd
1,2-Dibromo-3-chloropropane	5.0	nd	nd	nd	nd	nd	nd
1,2,4-Trichlorobenzene	5.0	nd	nd	nd	nd	nd	nd
Hexachlorobutadiene	5.0	nd	nd	nd	nd	nd	nd
Naphthalene	5.0	nd	nd	nd	nd	nd	nd
1,2,3-Trichlorobenzene	5.0	nd	nd	nd	nd	nd	nd
Surrogate Recovery (1,2-DCA-d4)		71%	77%	112%	83%	79%	72%
Surrogate Recovery (Toluene-d8)		81%	75%	118%	86%	82%	72%
Surrogate Recovery (1,4-BFB)		92%	78%	134%	99%	88%	72%

'RL' Indicates reporting limit at a dilution factor of 1

'nd' Indicates not detected at listed reporting limits

Analyses performed by: Mr. Leif Jonsson

11350 Monier Park Place, Rancho Cordova, CA 95742 • Phone (916) 853-8010 • Fax (916) 853-8020

TEG Project #41229F

teg

Tetra Tech - DIV Project # 100-SWW-T31331 Task 3.62
Berryessa Creek Channel, Milpitas, California

EPA Method 8260B Analyses of SOIL in ug/Kg

SAMPLE NUMBER:		ST-3-10'	ST-3-15'	ST-3-20'	ST-4-5'	ST-4-10'	ST-4-15'
COLLECTION DATE:		12/29/14	12/29/14	12/29/14	12/29/14	12/29/14	12/29/14
ANALYSIS DATE:		12/29/14	12/29/14	12/29/14	12/29/14	12/29/14	12/30/14
DILUTION FACTOR:	RL	1	1	1	1	1	1
Dichlorodifluoromethane	5.0	nd	nd	nd	nd	nd	nd
Chloromethane	5.0	nd	nd	nd	nd	nd	nd
Vinyl Chloride	5.0	nd	nd	nd	nd	nd	nd
Bromomethane	5.0	nd	nd	nd	nd	nd	nd
Chloroethane	5.0	nd	nd	nd	nd	nd	nd
Trichlorofluoromethane	5.0	nd	nd	nd	nd	nd	nd
1,1-Dichloroethene	5.0	nd	nd	nd	nd	nd	nd
Methylene Chloride	5.0	nd	nd	nd	nd	nd	nd
trans-1,2-Dichloroethene	5.0	nd	nd	nd	nd	nd	nd
1,1-Dichloroethane	5.0	nd	nd	nd	nd	nd	nd
2,2-Dichloropropane	5.0	nd	nd	nd	nd	nd	nd
cis-1,2-Dichloroethene	5.0	nd	nd	nd	nd	nd	nd
Chloroform	5.0	nd	nd	nd	nd	nd	nd
Bromochloromethane	5.0	nd	nd	nd	nd	nd	nd
1,1,1-Trichloroethane	5.0	nd	nd	nd	nd	nd	nd
1,1-Dichloropropene	5.0	nd	nd	nd	nd	nd	nd
Carbon Tetrachloride	5.0	nd	nd	nd	nd	nd	nd
1,2-Dichloroethane	5.0	nd	nd	nd	nd	nd	nd
Benzene	5.0	nd	nd	nd	nd	nd	nd
Trichloroethene	5.0	nd	nd	8.9	nd	17	19
1,2-Dichloropropane	5.0	nd	nd	nd	nd	nd	nd
Bromodichloromethane	5.0	nd	nd	nd	nd	nd	nd
Dibromomethane	5.0	nd	nd	nd	nd	nd	nd
cis-1,3-Dichloropropene	5.0	nd	nd	nd	nd	nd	nd
Toluene	5.0	nd	nd	nd	nd	nd	nd
trans-1,3-Dichloropropene	5.0	nd	nd	nd	nd	nd	nd
1,1,2-Trichloroethane	5.0	nd	nd	nd	nd	nd	nd
1,2-Dibromoethane	5.0	nd	nd	nd	nd	nd	nd
1,3-Dichloropropane	5.0	nd	nd	nd	nd	nd	nd
Tetrachloroethene	5.0	nd	nd	9.1	21	150	150
Dibromochloromethane	5.0	nd	nd	nd	nd	nd	nd
Chlorobenzene	5.0	nd	nd	nd	nd	nd	nd
Ethylbenzene	5.0	nd	nd	nd	nd	nd	nd
1,1,1,2-Tetrachloroethane	5.0	nd	nd	nd	nd	nd	nd
m,p-Xylene	5.0	nd	nd	nd	nd	nd	nd
o-Xylene	5.0	nd	nd	nd	nd	nd	nd
Styrene	5.0	nd	nd	nd	nd	nd	nd
Bromoform	5.0	nd	nd	nd	nd	nd	nd
Isopropylbenzene	5.0	nd	nd	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	5.0	nd	nd	nd	nd	nd	nd
1,2,3-Trichloropropane	5.0	nd	nd	nd	nd	nd	nd
n-propylbenzene	5.0	nd	nd	nd	nd	nd	nd
Bromobenzene	5.0	nd	nd	nd	nd	nd	nd
1,3,5-Trimethylbenzene	5.0	nd	nd	nd	nd	nd	nd
2-Chlorotoluene	5.0	nd	nd	nd	nd	nd	nd
4-Chlorotoluene	5.0	nd	nd	nd	nd	nd	nd
tert-Butylbenzene	5.0	nd	nd	nd	nd	nd	nd
1,2,4-Trimethylbenzene	5.0	nd	nd	nd	nd	nd	nd
sec-Butylbenzene	5.0	nd	nd	nd	nd	nd	nd
p-Isopropyltoluene	5.0	nd	nd	nd	nd	nd	nd
1,3-Dichlorobenzene	5.0	nd	nd	nd	nd	nd	nd
1,4-Dichlorobenzene	5.0	nd	nd	nd	nd	nd	nd
n-Butylbenzene	5.0	nd	nd	nd	nd	nd	nd
1,2-Dichlorobenzene	5.0	nd	nd	nd	nd	nd	nd
1,2-Dibromo-3-chloropropane	5.0	nd	nd	nd	nd	nd	nd
1,2,4-Trichlorobenzene	5.0	nd	nd	nd	nd	nd	nd
Hexachlorobutadiene	5.0	nd	nd	nd	nd	nd	nd
Naphthalene	5.0	nd	nd	nd	nd	nd	nd
1,2,3-Trichlorobenzene	5.0	nd	nd	nd	nd	nd	nd
Surrogate Recovery (1,2-DCA-d4)		74%	75%	73%	65%	89%	69%
Surrogate Recovery (Toluene-d8)		69%	80%	75%	70%	83%	80%
Surrogate Recovery (1,4-BFB)		83%	87%	86%	71%	92%	81%

'RL' Indicates reporting limit at a dilution factor of 1

'nd' Indicates not detected at listed reporting limits

Analyses performed by: Mr. Leif Jonsson

11350 Monier Park Place, Rancho Cordova, CA 95742 • Phone (916) 853-8010 • Fax (916) 853-8020

EPA Method 8260B Analyses of SOIL in ug/Kg

SAMPLE NUMBER:		ST-4-20'	ST-5-5'	ST-5-10'	ST-5-15'	ST-5-15' D	ST-5-20'
COLLECTION DATE:		12/29/14	12/29/14	12/29/14	12/29/14	12/29/14	12/29/14
ANALYSIS DATE:		12/30/14	12/29/14	12/29/14	12/29/14	12/29/14	12/29/14
DILUTION FACTOR:	RL	1	1	1	1	1	1
Dichlorodifluoromethane	5.0	nd	nd	nd	nd	nd	nd
Chloromethane	5.0	nd	nd	nd	nd	nd	nd
Vinyl Chloride	5.0	nd	nd	nd	nd	nd	nd
Bromomethane	5.0	nd	nd	nd	nd	nd	nd
Chloroethane	5.0	nd	nd	nd	nd	nd	nd
Trichlorofluoromethane	5.0	nd	nd	nd	nd	nd	nd
1,1-Dichloroethene	5.0	8.4	nd	nd	nd	nd	nd
Methylene Chloride	5.0	nd	nd	nd	nd	nd	nd
trans-1,2-Dichloroethene	5.0	nd	nd	nd	nd	nd	nd
1,1-Dichloroethane	5.0	nd	nd	nd	nd	nd	nd
2,2-Dichloropropane	5.0	nd	nd	nd	nd	nd	nd
cis-1,2-Dichloroethene	5.0	nd	nd	nd	nd	nd	nd
Chloroform	5.0	nd	nd	nd	nd	nd	nd
Bromochloromethane	5.0	nd	nd	nd	nd	nd	nd
1,1,1-Trichloroethane	5.0	nd	nd	nd	nd	nd	nd
1,1-Dichloropropene	5.0	nd	nd	nd	nd	nd	nd
Carbon Tetrachloride	5.0	nd	nd	nd	nd	nd	nd
1,2-Dichloroethane	5.0	nd	nd	nd	nd	nd	nd
Benzene	5.0	nd	nd	nd	nd	nd	nd
Trichloroethene	5.0	84	nd	nd	nd	nd	nd
1,2-Dichloropropane	5.0	nd	nd	nd	nd	nd	nd
Bromodichloromethane	5.0	nd	nd	nd	nd	nd	nd
Dibromomethane	5.0	nd	nd	nd	nd	nd	nd
cis-1,3-Dichloropropene	5.0	nd	nd	nd	nd	nd	nd
Toluene	5.0	nd	nd	nd	nd	nd	nd
trans-1,3-Dichloropropene	5.0	nd	nd	nd	nd	nd	nd
1,1,2-Trichloroethane	5.0	nd	nd	nd	nd	nd	nd
1,2-Dibromoethane	5.0	nd	nd	nd	nd	nd	nd
1,3-Dichloropropane	5.0	nd	nd	nd	nd	nd	nd
Tetrachloroethene	5.0	1800	nd	nd	nd	nd	10
Dibromochloromethane	5.0	nd	nd	nd	nd	nd	nd
Chlorobenzene	5.0	nd	nd	nd	nd	nd	nd
Ethylbenzene	5.0	nd	nd	nd	nd	nd	nd
1,1,1,2-Tetrachloroethane	5.0	nd	nd	nd	nd	nd	nd
m,p-Xylene	5.0	nd	nd	nd	nd	nd	nd
o-Xylene	5.0	nd	nd	nd	nd	nd	nd
Styrene	5.0	nd	nd	nd	nd	nd	nd
Bromoform	5.0	nd	nd	nd	nd	nd	nd
Isopropylbenzene	5.0	nd	nd	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	5.0	nd	nd	nd	nd	nd	nd
1,2,3-Trichloropropane	5.0	nd	nd	nd	nd	nd	nd
n-propylbenzene	5.0	nd	nd	nd	nd	nd	nd
Bromobenzene	5.0	nd	nd	nd	nd	nd	nd
1,3,5-Trimethylbenzene	5.0	nd	nd	nd	nd	nd	nd
2-Chlorotoluene	5.0	nd	nd	nd	nd	nd	nd
4-Chlorotoluene	5.0	nd	nd	nd	nd	nd	nd
tert-Butylbenzene	5.0	nd	nd	nd	nd	nd	nd
1,2,4-Trimethylbenzene	5.0	nd	nd	nd	nd	nd	nd
sec-Butylbenzene	5.0	nd	nd	nd	nd	nd	nd
p-Isopropyltoluene	5.0	nd	nd	nd	nd	nd	nd
1,3-Dichlorobenzene	5.0	nd	nd	nd	nd	nd	nd
1,4-Dichlorobenzene	5.0	nd	nd	nd	nd	nd	nd
n-Butylbenzene	5.0	nd	nd	nd	nd	nd	nd
1,2-Dichlorobenzene	5.0	nd	nd	nd	nd	nd	nd
1,2-Dibromo-3-chloropropane	5.0	nd	nd	nd	nd	nd	nd
1,2,4-Trichlorobenzene	5.0	nd	nd	nd	nd	nd	nd
Hexachlorobutadiene	5.0	nd	nd	nd	nd	nd	nd
Naphthalene	5.0	nd	nd	nd	nd	nd	nd
1,2,3-Trichlorobenzene	5.0	nd	nd	nd	nd	nd	nd
Surrogate Recovery (1,2-DCA-d4)		76%	72%	96%	71%	67%	84%
Surrogate Recovery (Toluene-d8)		79%	76%	95%	82%	73%	87%
Surrogate Recovery (1,4-BFB)		85%	78%	102%	85%	76%	92%

'RL' Indicates reporting limit at a dilution factor of 1

'nd' Indicates not detected at listed reporting limits

Analyses performed by: Mr. Leif Jonsson

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teg

Tetra Tech - DIV Project # 100-SWW-T31331 Task 3.62
Berryessa Creek Channel, Milpitas, California

TEG Project #41229F

QA/QC Data - Matrix Spike Analyses / LCS - SOIL

SAMPLE NUMBER	DATE ANALYZED	1,1 DCE ug/Kg	Benzene ug/Kg	Trichloroethene ug/Kg	Toluene ug/Kg	Chlorobenzene ug/Kg
ST-3-5'						
Spiked Conc.	12/29/14	25.0	25.0	25.0	25.0	25.0
Measured Conc.		28.4	28.3	28.9	29.6	26.8
% Recovery		114%	113%	116%	118%	107%
Spiked Conc.	12/29/14	25.0	25.0	25.0	25.0	25.0
Measured Conc.		29.9	27.9	30.7	28.2	30.0
% Recovery		120%	112%	123%	113%	120%
RPD		5.1%	1.4%	6.0%	4.8%	11.3%
LCS						
Spiked Conc.	12/29/14	25.0	25.0	25.0	25.0	25.0
Measured Conc.		22.9	21.5	22.9	23.3	21.5
% Recovery		92%	86%	92%	93%	86%
ST-5-5'						
Spiked Conc.	12/30/14	25.0	25.0	25.0	25.0	25.0
Measured Conc.		23.3	20.9	20.7	19.9	24.3
% Recovery		93%	84%	83%	80%	97%
Spiked Conc.	12/30/14	25.0	25.0	25.0	25.0	25.0
Measured Conc.		24.1	23.3	21.7	22.0	24.8
% Recovery		96%	93%	87%	88%	99%
RPD		3.4%	10.9%	4.7%	10.0%	2.0%
LCS						
Spiked Conc.	12/30/14	25.0	25.0	25.0	25.0	25.0
Measured Conc.		24.7	21.8	23.2	21.8	25.2
% Recovery		99%	87%	93%	87%	101%

Acceptable RPD Limit = 25%

TEG Project #41229F

Tetra Tech - DIV Project # 100-SWW-T31331 Task 3.62
Berryessa Creek Channel, Milpitas, California

EPA Method 8260B Analyses of WATER in ug/L

SAMPLE NUMBER:		Blank	ST-2-W	ST-3-W
COLLECTION DATE:			12/29/14	12/29/14
ANALYSIS DATE:		12/30/14	12/30/14	12/30/14
DILUTION FACTOR:		1	1	1
	RL			
Dichlorodifluoromethane	1.0	nd	nd	nd
Chloromethane	1.0	nd	nd	nd
Vinyl Chloride	1.0	nd	nd	nd
Bromomethane	1.0	nd	nd	nd
Chloroethane	1.0	nd	nd	nd
Trichlorofluoromethane	1.0	nd	nd	nd
1,1-Dichloroethene	1.0	nd	nd	nd
Methylene Chloride	1.0	nd	nd	nd
trans-1,2-Dichloroethene	1.0	nd	nd	nd
1,1-Dichloroethane	1.0	nd	nd	nd
2,2-Dichloropropane	1.0	nd	nd	nd
cis-1,2-Dichloroethene	1.0	nd	nd	nd
Chloroform	1.0	nd	nd	nd
Bromochloromethane	1.0	nd	nd	nd
1,1,1-Trichloroethane	1.0	nd	nd	nd
1,1-Dichloropropene	1.0	nd	nd	nd
Carbon Tetrachloride	1.0	nd	nd	nd
1,2-Dichloroethane	1.0	nd	nd	nd
Benzene	1.0	nd	nd	nd
Trichloroethene	1.0	nd	1.3	5.6
1,2-Dichloropropane	1.0	nd	nd	nd
Bromodichloromethane	1.0	nd	nd	nd
Dibromomethane	1.0	nd	nd	nd
cis-1,3-Dichloropropene	1.0	nd	nd	nd
Toluene	1.0	nd	nd	nd
trans-1,3-Dichloropropene	1.0	nd	nd	nd
1,1,2-Trichloroethane	1.0	nd	nd	nd
1,2-Dibromoethane	1.0	nd	nd	nd
1,3-Dichloropropane	1.0	nd	nd	nd
Tetrachloroethene	1.0	nd	nd	3.0
Dibromochloromethane	1.0	nd	nd	nd
Chlorobenzene	1.0	nd	nd	nd
Ethylbenzene	1.0	nd	nd	nd
1,1,1,2-Tetrachloroethane	1.0	nd	nd	nd
m,p-Xylene	1.0	nd	2.0	nd
o-Xylene	1.0	nd	1.2	nd
Styrene	1.0	nd	nd	nd
Bromoform	1.0	nd	nd	nd
Isopropylbenzene	1.0	nd	nd	nd
1,1,2,2-Tetrachloroethane	1.0	nd	nd	nd
1,2,3-Trichloropropane	1.0	nd	nd	nd
n-propylbenzene	1.0	nd	nd	nd
Bromobenzene	1.0	nd	nd	nd
1,3,5-Trimethylbenzene	1.0	nd	nd	nd
2-Chlorotoluene	1.0	nd	nd	nd
4-Chlorotoluene	1.0	nd	nd	nd
tert-Butylbenzene	1.0	nd	nd	nd
1,2,4-Trimethylbenzene	1.0	nd	1.1	nd
sec-Butylbenzene	1.0	nd	nd	nd
p-Isopropyltoluene	1.0	nd	nd	nd
1,3-Dichlorobenzene	1.0	nd	nd	nd
1,4-Dichlorobenzene	1.0	nd	nd	nd
n-Butylbenzene	1.0	nd	nd	nd
1,2-Dichlorobenzene	1.0	nd	nd	nd
1,2-Dibromo-3-chloropropane	1.0	nd	nd	nd
1,2,4-Trichlorobenzene	1.0	nd	nd	nd
Hexachlorobutadiene	1.0	nd	nd	nd
Naphthalene	1.0	nd	nd	nd
1,2,3-Trichlorobenzene	1.0	nd	nd	nd
Surrogate Recovery (1,2-DCA-d4)		82%	76%	70%
Surrogate Recovery (Toluene-d8)		91%	92%	89%
Surrogate Recovery (1,4-BFB)		89%	84%	82%

'RL' Indicates reporting limit at a dilution factor of 1

'nd' Indicates not detected at listed reporting limits

Analyses performed by: Mr. Leif Jonsson

Tetra Tech - DIV Project # 100-SWW-T31331 Task 3.62
Berryessa Creek Channel, Milpitas, California

TEG Project #41229F

QA/QC Data - Matrix Spike Analyses / LCS - WATER

SAMPLE NUMBER	DATE ANALYZED	1,1 DCE ug/L	Benzene ug/L	Trichloroethene ug/L	Toluene ug/L	Chlorobenzene ug/L
ST-2-W						
Spiked Conc.	12/30/14	25.0	25.0	25.0	25.0	25.0
Measured Conc.		24.3	21.9	22.0	22.4	28.1
% Recovery		97%	88%	88%	90%	112%
Spiked Conc.	12/30/14	25.0	25.0	25.0	25.0	25.0
Measured Conc.		27.6	25.0	25.2	26.1	31.6
% Recovery		110%	100%	101%	104%	126%
RPD		12.7%	13.2%	13.6%	15.3%	11.7%
LCS						
Spiked Conc.	12/30/14	25.0	25.0	25.0	25.0	25.0
Measured Conc.		25.2	21.8	21.4	21.9	28.6
% Recovery		101%	87%	86%	88%	114%

Acceptable RPD Limit = 25%

TEG Northern California Inc.

Chain of Custody Record

11350 Monier Park Place Ph: 916.853.8010
Rancho Cordova, CA 95742 Fax: 916.853.8020

Page: 1 of 2

Client: TETRA TECH - DIV

Address: 17885 VON KARMAN AVE, SUITE 500
IRVINE, CA 92614 - 6213

Phone: 949-809-5000 Fax: 949-809-5010

Project Manager: IRA MARK ARTZ E-Mail: IRA.ARTZ@TETRATECH.COM

TEG Project #: 41229F Client Project #: 100SWW-T3131 task 3.6.2

Location: BERRYESSA CREEK CHANNEL, MILPITAS, CA

Collector: KEITH HOFFARD Date of Collection: 12-29-14

Sample Designation	Depth	Time	Sample Matrix	Container Type	EPA 8260B (Full List)	EPA 8260B (DTSC List)	EPA 8260B (BTEX & MTBE)	5 Oxygenates, BTEX (8260B)	TPH gasoline (8260)	EPA 8021 (BTEX)	EPA 8021 (HVOCs)	TPH 8015mod (gas)	TPH 8015mod (diesel)	TPH 8015mod (motor oil)			Field Notes	# of containers
ST-2-5'	5'	0823	SOIL	ACETATE TUBE	X													
ST-2-10'	10'	0827																
ST-2-15'	15'	0830																
ST-2-20'	20'	0835																
ST-2-W	—	0907	H2O	3 VOAs														
ST-3-5'	5'	0948	SOIL	ACETATE TUBE														
ST-3-10'	10'	0953																
ST-3-15'	15'	0957																
ST-3-20'	20'	1000																
ST-3-W	—	1025	H2O	3 VOAs														
ST-5-5'	5'	1050	SOIL	ACETATE TUBE														
ST-5-10'	10'	1052																
ST-5-15'	15'	1055																
ST-5-15'D	15'	1055																
ST-5-20'	20'	1058																

Relinquished by:	Date / Time	Received by	Date / Time
Keith Hoffard	12-29-14 1300	[signature]	12/29/14 1300

Sample Receipt:

Good Condition?	good
Cold?	NA
Seals Intact?	NA
Total Number of Containers	

Remarks:

Distribution: White - Lab, Yellow - File, Pink - Originator

Sample disposal instructions: ___ *TEG disposal @ $4.00 ea.* ___ *Return to client* ___ *Pickup*

TEG Northern California Inc.

Chain of Custody Record

11350 Monier Park Place
Rancho Cordova, CA 95742
Ph: 916.853.8010
Fax: 916.853.8020

Client: TETRA TECH - DIV

Address:

IRVINE, CA

Phone: Fax:

Project Manager: IRA MARK ARTZ E-Mail:

TEG Project #: 41229F Client Project #: see p. 1

Location:

Collector: KEITH HOOFARD Date of Collection: 12-29-14

Sample Designation	Depth	Time	Sample Matrix	Container Type	EPA 8260B (Full List)	EPA 8260B (DTSC List)	EPA 8260B (BTEX & MTBE)	5 Oxygenates, BTEX (8260B)	TPH gasoline (8260)	EPA 8021 (BTEX)	EPA 8021 (HVOCs)	TPH 8015mod (gas)	TPH 8015mod (diesel)	TPH 8015mod (motor oil)	Field Notes	# of containers
ST-4-5'	5'	1134	SOIL	ACETATE TUBE	X											
ST-4-10'	10'	1138														
ST-4-15'	15'	1139														
ST-4-20'	20'	1142														
ST-1-5'	5'	1221														
ST-1-10'	10'	1224														
ST-1-10'D	10'	1224														
ST-1-15'	15'	1228														
ST-1-20'	20'	1232														
END																

Relinquished by:	Date / Time	Received by	Date / Time
Keith Hoofard	12-29-14 1300	[signature]	12-29-14 1330

Sample Receipt:

Good Condition?	Good
Cold?	NA
Seals Intact?	NA
Total Number of Containers	

Remarks:

Distribution: White - Lab, Yellow - File, Pink - Originator

Sample disposal instructions: __ *TEG disposal @ $4.00 ea.* __ *Return to client* __ *Pickup*

Appendix F Tree and Shrub Survey Report and Impact Analysis

Santa Clara Valley Water District

Technical Memorandum: Mitigation for Native Trees/Shrubs Removed During Construction of Upper Berryessa Creek Flood Risk Management Project

Prepared By: James Manitakos, Environmental Planner II
Date: September 14, 2015

Summary

Mitigating for the removal of trees and shrubs per mitigation measures included in the project environmental documents will require planting of roughly 550 native trees/shrubs in the project area.

Purpose

The U.S. Army Corps of Engineers (USACE) is the lead agency for the Upper Berryessa Creek Flood Risk Management Project. The District is the local partner and non-federal sponsor. In March 2014, USACE issued a Final Environmental Impact Statement (EIS) for the project. The Final EIS includes the following measure to mitigate for removal of native vegetation during project construction:

> If a native tree or shrub with a diameter at breast height (dbh) of 2 inches or greater is removed, it should be replaced in-kind so that the combined diameter of the container plantings is equal to the combined diameter of the trees removed.

This measure is based on recommendations in the U.S Fish and Wildlife Coordination Act Report prepared for the project.

Evaluation

To determine the number of native trees/shrubs that would be removed by the project, the District contracted with HT Harvey for a field inventory of the project area in July 2015. The field inventory found that a total of 432 trees and shrubs with dbh of 2 inches or greater occur in or near the project area. Most of these are non-native, but a number of native trees/shrubs would be either directly removed or subject to substantial root damage which would threaten their viability) during construction. Based on the 60% design plans for the project, a total of 53 native trees/shrubs would be affected. Table 1 provides information on those trees and shrubs.

Table 1: Native Trees/Shrubs to be Impacted By Project Construction

Designator	Common Name	DBH (inches)	Type of Impact	Reach
7	Redwood	28	Constructing crane pad on east bank upstream Calaveras Blvd will remove	1
54	Coast live oak	12	Connection of access road to Los Coches St will remove this street tree	2
61	Toyon	3	Channel enlargement on east bank upstream of Arroyo de Los Coches will remove	2
62	Coast live oak	12		
63	Toyon	15		
64	Toyon	22		
66	Toyon	14		
67	White alder	11		
68	White alder	12		
69	Toyon	12		
70	Toyon	12		
71	White alder	8		
72	Toyon	28		
73	Toyon	12		
74	Toyon	16		
75	Toyon	31		
76	Toyon	16		
77	Toyon	17		
80	Toyon	11		
81	Toyon	11		
82	Toyon	16		
83	Toyon	15		
84	Toyon	10		
85	Toyon	14		
86	Toyon	8		
87	Fremont Cottonwood	17		
88	Fremont Cottonwood	14		
89	Toyon	10		

Designator	Common Name	DBH (inches)	Type of Impact	Reach
113	California nutmeg	23	Channel enlargement on east bank upstream of Arroyo de Los Coches will remove	2
118	California nutmeg	17		
120	California nutmeg	20		
122	California nutmeg	14		
126	White alder	7		
130	White alder	9		
132	White alder	10		
164	Coast live oak	6	Constructing RR culvert wing wall will remove	3
165	Coast live oak	6		
166	Coast live oak	34		
167	Coast live oak	17		
168	Coast live oak	5	Channel enlargement downstream of UPRR trestle will remove	3
170	Elderberry	46		
171	Valley oak	8		
173	Elderberry	10		
174	Coast live oak	6		
176	Coyote brush	16	Constructing access road connection to Montague Exwy will remove	3
214	Arroyo Willow	14	Constructing access road will remove	4
390	Coast live oak	24	Removing sediment at bend downstream I-680 will damage roots	4
421	Coast live oak	5		
425	Coast live oak	8		
426	Coast live oak	8		
427	Fremont cottonwood	124		
428	Fremont cottonwood	18		
430	Fremont cottonwood	28		

Table 2 provides a summary the number of native trees and shrubs impacted and their cumulative DBH for Reaches 1 through 3, Reach 4, and for the overall project. A total of 53 native trees/shrubs would be impacted during project construction. Based on the replacement formula contained in the CAR and EIS, native trees and shrubs with cumulative diameter of 890 inches would have to be planted to mitigate for the project impact to native trees and shrubs. These plantings should occur within the project vicinity.

Table 2: Impacted Trees/Shrubs by Reach

Reach	**No. Tree/Shrubs Impacted**	**Type (no.)**	**Total dbh (in)**
1	1	Redwood	28
2	34	California nutmeg (4) Coast live oak (2) Fremont cottonwood (2) Toyon (20) White Alder (6)	479
3	10	Coast live oak (6) Coyote brush (1) Elderberry (2) Valley oak (1)	154
4	8	Arroyo willow (1) Coast live oak (4) Fremont cottonwood (3)	229
Total Project	**53**		**890**

ATTACHMENTS

1. H.T. Harvey and Associates. Upper Berryessa Creek Flood Risk Management Project Tree and Shrub Survey, Milpitas and San Jose, CA. August 4, 2015.
2. Figure 1a, Trees and Shrub Map, Upper Berryessa Creek, July 2015.
3. Figure 1b, Trees and Shrub Map, Upper Berryessa Creek, July 2015.
4. Figure 1c, Trees and Shrub Map, Upper Berryessa Creek, July 20

ATTACHMENTS

H. T. HARVEY & ASSOCIATES

Ecological Consultants

Upper Berryessa Creek Flood Risk Management Project
Tree and Shrub Survey
Milpitas and San Jose, California

Project #3270-52

Prepared for:

James Manitakos
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

Prepared by:

H. T. Harvey & Associates

4 August 2015

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List of Preparers

Steve Rottenborn, Ph.D., Senior Wildlife Ecologist, Principal
Kelly Hardwicke, Ph.D., Senior Plant Ecologist, Project Manager
Élan Alford, Ph.D., Plant Ecologist

Section 1. Introduction

H. T. Harvey & Associates conducted a tree survey for the Upper Berryessa Creek Flood Risk Management Project (Project), which is in the City of Milpitas and the City of San Jose, California, for the Santa Clara Valley Water District (District). The data presented herein represent a complete inventory of all trees in the survey area that are greater than or equal to 2 inches in diameter at breast height ([dbh] measured at 4.5 feet (ft) above ground level) for single stem trees or additive diameter for multiple stem trees. Shrubs with stem dbh greater than 2 inches were also included. The data collected includes species identity, native status, diameter, health, and location in the survey area. The purpose of this survey is to allow planners to determine which trees are to be removed, relocated, or preserved in place. The report does not determine the fate of the trees.

1.1 General Project Area Description

The Upper Berryessa Creek channel is west of Interstate 680 in the city limits of Milpitas and San Jose, California (Figure 1). The Project site study area encompasses the maximum area of anticipated temporary and permanent construction effects resulting from the Project. The site includes the downstream section of the existing bridge crossing at E. Calaveras Blvd. and continues for approximately two miles upstream to the upstream section beyond Landess Ave (Figure 1). The study area for this survey includes the stream bed, channelized banks, and staging areas above the top-of-bank, as well as an approximately 5-ft buffer on the Project site limits. The purpose of the 5-ft buffer is to identify trees located outside the project footprint that may be substantially harmed by root damage due to project construction. Upper Berryessa Creek traverses an urban area with residences, businesses, multilane streets, and railroad tracks. The streambed is primarily earthen, approximately 10-15 feet wide, and is flanked by channelized riparian grassland. The majority of the trees within the Project site corridor occur above top of bank and few occur within the riparian banks.

H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 1a. Tree and Shrub Map
Upper Berryessa Creek (3270-52)
July 2015

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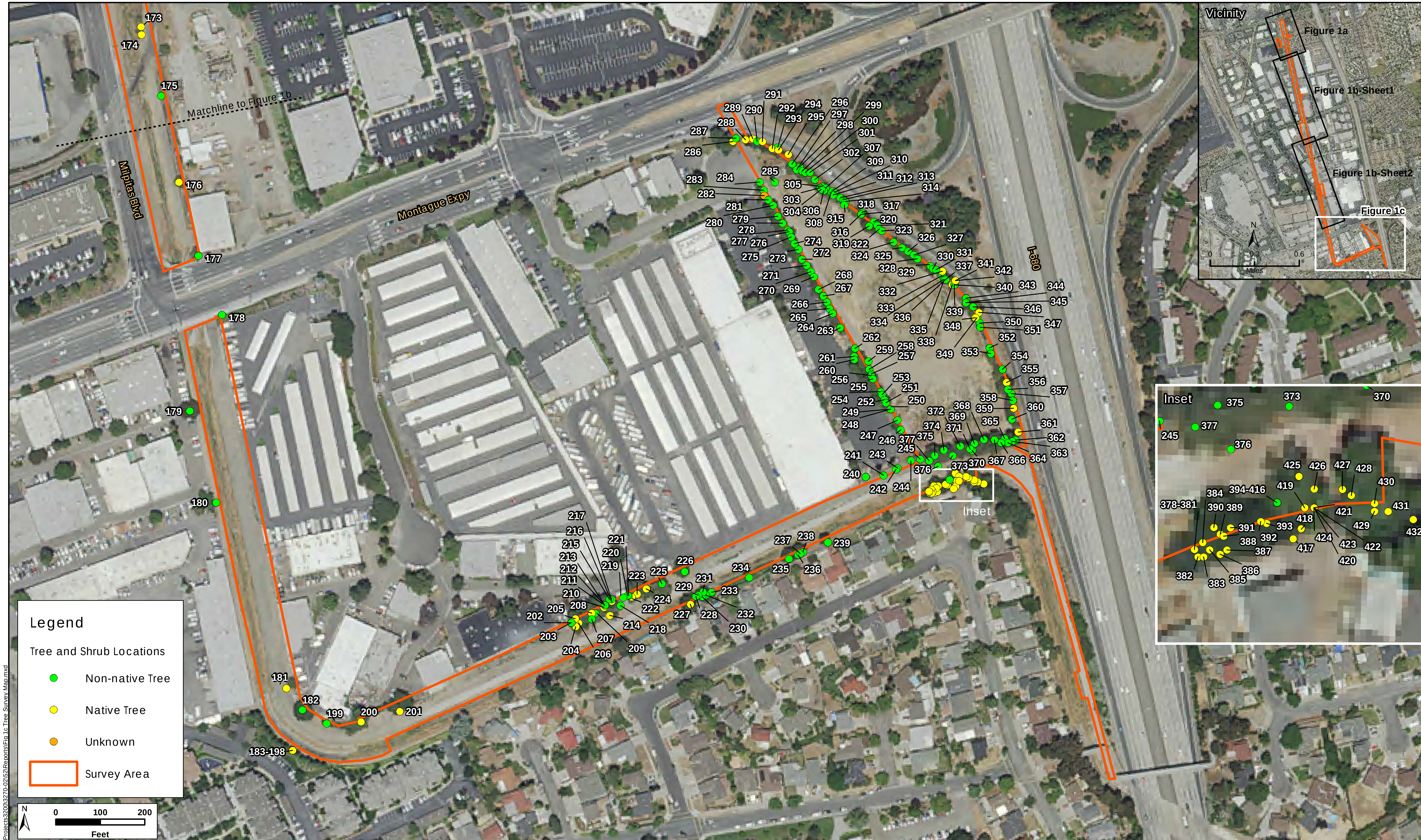
Figure 1b. Tree and Shrub Map
Upper Berryessa Creek (3270-52)
July 2015



H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 1c. Tree and Shrub Map
Upper Berryessa Creek (3270-52)
July 2015

Section 2. Methodology

For the purposes of this report, a "tree" was defined as a woody species that typically grows with a single trunk and with a dbh of 2 inches or greater. Trees with multiple stems were included in the survey when at least one stem was larger than 2 inches dbh. Shrub species such as coyote brush (*Baccharis pilularis*) and manzanita (*Arctostaphylos sp.*) were also included if at least one stem dbh was 2 inches or greater. Small shrubs, small trees, or saplings (e.g. those less than 2 inches dbh) were not included in this survey. Plant identification was conducted according to the Jepson eFlora (Jepson Flora Project 2015), *Trees of the California Landscape* (Hatch 2007), and *A Californian's Guide to the Trees among Us* (Ritter 2011).

H.T. Harvey & Associates plant ecologists Élan Alford, Ph.D. and Brian Cleary, M.S. visited the Project site on 30 June, 1 July, and 2 July 2015 to conduct the tree survey. All trees of 2 inches dbh or larger within the Project site were recorded, and all accessible trees were tagged with aluminum labels. Inaccessible trees were recorded but not marked in the field. Information on tree species, native status, dbh, health, and tree location were collected. For accessible trees, the dbh of each tree was measured with a Biltmore stick at approximately 4.5 ft above ground level. The dbh for trees with multiple stems was calculated by adding all stem diameters larger than 2 inches. The dbh of inaccessible trees was visually estimated and recorded. Tree health was scored by visual inspection using a three-tiered scoring system (healthy, stressed, dead). Indicators of good health included high leaf production, a normal growth pattern, and no evidence of disease. Indicators of stressed included adequate, but not high, leaf production, reduced growth because of competition for space or light, and the presence of minimal levels of stump sprouting, limb loss, an abundance of brown leaves, and/or disease. Dead trees were indicated by the presence of only brown leaves or no leaf production.

Section 3. Results

A total of 432 trees or shrubs with a dbh of 2 inches or greater were recorded in the Project site (Figure 1). Figure 1 shows all tree locations and is consecutively numbered. The field tags differ from the report numbering, but the provided database (Appendix A and the corresponding electronic excel file) correlates these two numbering systems, The tree database includes tag numbers for trees marked in the field and the consecutive order in which the trees are labelled in the report figures.

Table 1 summarizes the all trees within the Project site by species, whether the species is native or non-native, the number of individuals that occur, and their average diameter. One tree was not identified to a degree such that it can be included in the summary of native or non-native trees. A total 145 native trees occur in the Project site. The average dbh of the native trees is 18 inches. The native trees most frequently encountered within the study area were redwood (*Sequoia sempervirens*, although it should be noted that redwoods would not be native to Berryessa Creek and many if not all of these specimens were likely planted) and coast live oak (*Quercus agrifolia*). A total of 286 non-native trees occur in the Project site. The average dbh of the non-native trees is 17 inches. The most common non-native species were Washington fan palm (*Washingtonia robusta*) and holly oak (*Quercus ilex*). The largest tree within the Project site is an approximately 112-inch dbh Fremont cottonwood (*Populus fremontii*). Appendix A lists each tree recorded in the survey by its designated report number, tag number marked in the field, common name, scientific name, dbh per stem, total diameter, whether the dbh was measured or estimated, and tree health. Appendix A is also provided as an excel file.

Table 1. Tree Summary Statistics

Common Name	Scientific Name	Native Status	Count	Average Total DBH (inch)
Native Trees	***n/a***	***Yes***	***145***	***18***
Non-native Trees	***n/a***	***No***	***286***	***17***
Unknown Tree	***n/a***	***n/a***	***1***	***6***
Aleppo pine	*Pinus halepensis*	No	29	16
Apple	*Malus* sp.	No	1	10
Arroyo willow	*Salix lasiolepis*	Yes	6	47
Ash	*Fraxinus* sp.	Yes	9	13
Black poui	*Jacaranda mimosifolia*	No	1	22
Blackwood acacia	*Acacia melanoxylon*	No	5	12
California nutmeg	*Torreya californica*	Yes	4	19
Canary Island pine	*Pinus canariensis*	No	1	3
Carob tree	*Ceratonia siliqua*	No	5	27
Chinese photinia	*Photinia sp.*	No	13	11
Chinese pistachio	*Pistacia chinensis*	No	10	15

Common Name	Scientific Name	Native Status	Count	Average Total DBH (inch)
Coast live oak	*Quercus agrifolia*	Yes	46	10
Coyote brush	*Baccharis pilularis*	Yes	1	16
Crapemyrtle	*Lagerstroemia indica*	No	2	2
Elderberry	*Sambucus nigra*	Yes	3	38
Elm	*Ulmus* sp.	No	1	21
European white birch	*Betula pendula*	No	1	15
Fremont cottonwood	*Populus fremontii*	Yes	12	52
Holly oak	*Quercus ilex*	No	51	10
Horsetail tree	*Casuarina equisetifolia*	No	10	35
Italian cypress	*Cupressus sempervirens*	No	4	8
Lollypop tree	*Myoporum laetum*	No	23	28
London planetree	*Platanus hybrida*	No	10	14
Manzanita	*Arctostaphylos* sp.	Yes	8	10
Mock orange	*Pittosporum tobira*	No	1	14
Monterey pine	*Pinus radiata*	Yes	1	18
Olive	*Olea europaea*	No	14	10
Orange	*Citrus* sp.	No	3	22
Ornamental plum	*Prunus* sp.	No	2	16
Pepper tree	*Schinus* sp.	No	7	12
Red ironbark	*Eucalyptus sideroxylon*	No	10	31
Redwood	*Sequoia sempervirens*	Yes	20	13
Silk tree	*Albizia julibrissin*	No	1	46
Silver dollar gum	*Eucalyptus polyanthemos*	No	12	17
Sweetgum	*Liquidambar styraciflua*	No	13	14
Toyon	*Heteromeles arbutifolia*	Yes	20	15
Tulip tree	*Liriodendron tulipifera*	No	2	14
Unknown dead tree	*Unknown*	Unknown	1	6
Unknown pine	*Pinus* sp.	No	2	22
Unknown shrub	*Rosaceae*	No	4	12
Valley oak	*Quercus lobata*	Yes	2	42
Washington fan palm	*Washingtonia robusta*	No	42	17
Weeping juniper	*Juniperus scopulorum*	No	6	14
White alder	*Alnus rhombifolia*	Yes	13	10

Common Name	Scientific Name	Native Status	Count	Average Total DBH (inch)
Grand Total			**432**	**17**

Section 4. References

Hatch, C. R. 2007. Trees of the California Landscape. University of California Press, Berkeley.

Jepson Flora Project (Baldwin, B.G., Keil, D.J., Markos, S., Mishler, B.D., Patterson, R., Rosatti, T.J., Wilen, D.H.). 2015. *Jepson eFlora. Available at* http://ucjeps.berkeley.edu/IJM.html. Accessed through July 2015.

Ritter, M. 2011. A Californian's Guide to the Trees among Us. Heyday, Berkeley, California.

Appendix A. Tree and Shrub Survey

Tree Number	Field Tag	Common Name	Scientific Name	Native Status	Stem dbh (inch)	Total dbh (inch)	Measurement Type	Health
1	178	Sweetgum	*Liquidambar styraciflua*	No	14	14	Measured	Stressed
2	180	London planetree	*Platanus hybrida*	No	30	30	Measured	Stressed
3	179	Sweetgum	*Liquidambar styraciflua*	No	7	7	Measured	Stressed
4	177	Sweetgum	*Liquidambar styraciflua*	No	24	24	Measured	Healthy
5	181	Sweetgum	*Liquidambar styraciflua*	No	5	5	Measured	Stressed
6	40	Unknown shrub	*Rosaceae*	No	1,2,3,5	11	Measured	Healthy
7	39	Redwood	*Sequoia sempervirens*	Yes	28	28	Measured	Healthy
8	41	Unknown shrub	*Rosaceae*	No	1,1,2,1,1	6	Measured	Healthy
9	42	Redwood	*Sequoia sempervirens*	Yes	11	11	Measured	Healthy
10	43	Washington fan palm	*Washingtonia robusta*	No	21	21	Measured	Healthy
11	44	Pepper tree	*Schinus sp.*	No	20	20	Measured	Healthy

Tree Number	Field Tag	Common Name	Scientific Name	Native Status	Stem dbh (inch)	Total dbh (inch)	Measurement Type	Health
12	45	Washington fan palm	*Washingtonia robusta*	No	18	18	Measured	Healthy
13	46	Olive	*Olea europaea*	No	5,4,6,3,2, 10	30	Measured	Healthy
14	47	Silver dollar gum	*Eucalyptus polyanthemos*	No	9, 3,8,2	22	Measured	Stressed
15	48	Unknown shrub	*Rosaceae*	No	2, 4,3,2	11	Measured	Healthy
16	49	Redwood	*Sequoia sempervirens*	Yes	8	8	Measured	Healthy
17	50	Washington fan palm	*Washingtonia robusta*	No	16	16	Measured	Healthy
18	51	Washington fan palm	*Washingtonia robusta*	No	28	28	Measured	Healthy
19	52	Holly oak	*Quercus ilex*	No	2,2,2,1,2	9	Measured	Healthy
20	53	Holly oak	*Quercus ilex*	No	2,2	4	Measured	Healthy
21	176	Orange	*Citrus sp.*	No	20	20	Measured	Stressed
22	175	Orange	*Citrus sp.*	No	6,4,4,1,3,3	21	Measured	Healthy
23	54	Washington fan palm	*Washingtonia robusta*	No	20	20	Measured	Healthy
24	55	Elm	*Ulmus sp.*	No	9,6,6	21	Measured	Stressed

Tree Number	Field Tag	Common Name	Scientific Name	Native Status	Stem dbh (inch)	Total dbh (inch)	Measurement Type	Health
25	56	Washington fan palm	*Washingtonia robusta*	No	20	20	Measured	Healthy
26	57	Washington fan palm	*Washingtonia robusta*	No	16	16	Measured	Healthy
27	58	Washington fan palm	*Washingtonia robusta*	No	19	19	Measured	Healthy
28	60	Washington fan palm	*Washingtonia robusta*	No	19	19	Measured	Healthy
29	59	Washington fan palm	*Washingtonia robusta*	No	19	19	Measured	Healthy
30	61	Washington fan palm	*Washingtonia robusta*	No	21	21	Measured	Healthy
31	62	Washington fan palm	*Washingtonia robusta*	No	21	21	Measured	Healthy
32	63	Washington fan palm	*Washingtonia robusta*	No	20	20	Measured	Healthy
33	64	Washington fan palm	*Washingtonia robusta*	No	17	17	Measured	Healthy
34	65	Washington fan palm	*Washingtonia robusta*	No	26	26	Measured	Healthy
35	67	Washington fan palm	*Washingtonia robusta*	No	14	14	Measured	Healthy
36	66	Washington fan palm	*Washingtonia robusta*	No	14	14	Measured	Healthy
37	68	Washington fan palm	*Washingtonia robusta*	No	14	14	Measured	Healthy

Tree Number	Field Tag	Common Name	Scientific Name	Native Status	Stem dbh (inch)	Total dbh (inch)	Measurement Type	Health
38	69	Washington fan palm	*Washingtonia robusta*	No	13	13	Measured	Healthy
39	70	Washington fan palm	*Washingtonia robusta*	No	11	11	Measured	Healthy
40	73	Washington fan palm	*Washingtonia robusta*	No	14	14	Measured	Healthy
41	74	Washington fan palm	*Washingtonia robusta*	No	14	14	Measured	Healthy
42	71	Washington fan palm	*Washingtonia robusta*	No	12	12	Measured	Healthy
43	72	Washington fan palm	*Washingtonia robusta*	No	12	12	Measured	Healthy
44	79	Red ironbark	*Eucalyptus sideroxylon*	No	16	16	Measured	Stressed
45	76	Red ironbark	*Eucalyptus sideroxylon*	No	14	14	Measured	Healthy
46	75	Washington fan palm	*Washingtonia robusta*	No	15	15	Measured	Healthy
47	77	Washington fan palm	*Washingtonia robusta*	No	16	16	Measured	Healthy
48	78	Washington fan palm	*Washingtonia robusta*	No	14	14	Measured	Healthy
49	80	Red ironbark	*Eucalyptus sideroxylon*	No	26	26	Measured	Healthy
50	81	Italian cypress	*Cupressus sempervirens*	No	6	6	Measured	Stressed

Tree Number	Field Tag	Common Name	Scientific Name	Native Status	Stem dbh (inch)	Total dbh (inch)	Measurement Type	Health
51	82	Italian cypress	*Cupressus sempervirens*	No	6	6	Measured	Stressed
52	83	Redwood	*Sequoia sempervirens*	Yes	28	28	Measured	Healthy
53	84	Chinese pistachio	*Pistacia chinensis*	No	3	3	Measured	Stressed
54	85	Coast live oak	*Quercus agrifolia*	Yes	12	12	Measured	Healthy
55	86	Coast live oak	*Quercus agrifolia*	Yes	8	8	Measured	Stressed
56	87	Coast live oak	*Quercus agrifolia*	Yes	12	12	Measured	Healthy
57	88	White alder	*Alnus rhombifolia*	Yes	10	10	Measured	Healthy
58	89	Coast live oak	*Quercus agrifolia*	Yes	8	8	Measured	Healthy
59	90	Ornamental plum	*Prunus sp.*	No	7,9	16	Measured	Stressed
60	91	Ornamental plum	*Prunus sp.*	No	9,6	15	Measured	Healthy
61	95	Toyon	*Heteromeles arbutifolia*	Yes	3	3	Measured	Stressed
62	94	Coast live oak	*Quercus agrifolia*	Yes	12	12	Measured	Healthy
63	93	Toyon	*Heteromeles arbutifolia*	Yes	5,4,3,1,2	15	Measured	Dead

Tree Number	Field Tag	Common Name	Scientific Name	Native Status	Stem dbh (inch)	Total dbh (inch)	Measurement Type	Health
64	92	Toyon	*Heteromeles arbutifolia*	Yes	3,3,4,2,2,3,3,2	22	Measured	Healthy
65	174	Orange	*Citrus sp.*	No	4,4,6,3,1,2,1,2,2	25	Measured	Stressed
66	96	Toyon	*Heteromeles arbutifolia*	Yes	3,2,1,1,4,3	14	Measured	Healthy
67	98	White alder	*Alnus rhombifolia*	Yes	11	11	Measured	Stressed
68	97	White alder	*Alnus rhombifolia*	Yes	2,2,2,2,2,1,1	12	Measured	Dead
69	99	Toyon	*Heteromeles arbutifolia*	Yes	4,2,2,1,1,2	12	Measured	Healthy
70	100	Toyon	*Heteromeles arbutifolia*	Yes	3,2,2,1,1,2,1	12	Measured	Healthy
71	103	White alder	*Alnus rhombifolia*	Yes	8	8	Measured	Stressed
72	101	Toyon	*Heteromeles arbutifolia*	Yes	4,4,3,3,3,3,4,1,2,1	28	Measured	Stressed
73	102	Toyon	*Heteromeles arbutifolia*	Yes	3,3,1,1,1,1,1,1	12	Measured	Healthy
74	104	Toyon	*Heteromeles arbutifolia*	Yes	3,4,3,1,2,1,1,1	16	Measured	Healthy
75	105	Toyon	*Heteromeles arbutifolia*	Yes	4,4,3,2,3,3,4,2,2,1,1,1,1	31	Measured	Dead
76	106	Toyon	*Heteromeles arbutifolia*	Yes	1,1,2,1,1,1,1,2,1,1,1,1,1,1	16	Measured	Healthy

Tree Number	Field Tag	Common Name	Scientific Name	Native Status	Stem dbh (inch)	Total dbh (inch)	Measurement Type	Health
77	107	Toyon	*Heteromeles arbutifolia*	Yes	4,2,2,1,1,1,2,1,1,2	17	Measured	Stressed
78	108	Crapemyrtle	*Lagerstroemia indica*	No	2	2	Measured	Healthy
79	109	Crapemyrtle	*Lagerstroemia indica*	No	2	2	Measured	Healthy
80	110	Toyon	*Heteromeles arbutifolia*	Yes	2,2,1,1,1,1,1,1,1	11	Measured	Healthy
81	111	Toyon	*Heteromeles arbutifolia*	Yes	1,2,2,1,1,1,1,2	11	Measured	Healthy
82	112	Toyon	*Heteromeles arbutifolia*	Yes	4,3,3,1,2,1,1,1	16	Measured	Healthy
83	113	Toyon	*Heteromeles arbutifolia*	Yes	3,3,2,1,1,2,1,1,1	15	Measured	Stressed
84	114	Toyon	*Heteromeles arbutifolia*	Yes	2,2,1,1,1,1,1,1	10	Measured	Healthy
85	115	Toyon	*Heteromeles arbutifolia*	Yes	2,2,2,2,1,1,1,1,1,1	14	Measured	Healthy
86	116	Toyon	*Heteromeles arbutifolia*	Yes	2,2,1,1,1,1	8	Measured	Healthy
87	117	Fremont cottonwood	*Populus fremontii*	Yes	10,2,2,1,1,1	17	Measured	Healthy
88	118	Fremont cottonwood	*Populus fremontii*	Yes	4,3,3,3,1	14	Measured	Healthy
89	119	Toyon	*Heteromeles arbutifolia*	Yes	2,2,1,1,1,1,1,1	10	Measured	Healthy

Tree Number	Field Tag	Common Name	Scientific Name	Native Status	Stem dbh (inch)	Total dbh (inch)	Measurement Type	Health
90	184	Sweetgum	*Liquidambar styraciflua*	No	16	16	Measured	Healthy
91	185	Sweetgum	*Liquidambar styraciflua*	No	21	21	Measured	Healthy
92	186	Sweetgum	*Liquidambar styraciflua*	No	17	17	Measured	Stressed
93	187	Sweetgum	*Liquidambar styraciflua*	No	15	15	Measured	Stressed
94	188	Sweetgum	*Liquidambar styraciflua*	No	15	15	Measured	Stressed
95	189	Sweetgum	*Liquidambar styraciflua*	No	10	10	Measured	Stressed
96	190	Sweetgum	*Liquidambar styraciflua*	No	18	18	Measured	Stressed
97	193	Sweetgum	*Liquidambar styraciflua*	No	18	18	Measured	Healthy
98	194	Italian cypress	*Cupressus sempervirens*	No	12	12	Measured	Healthy
99	192	Sweetgum	*Liquidambar styraciflua*	No	5	5	Measured	Stressed
100	191	European white birch	*Betula pendula*	No	15	15	Measured	Stressed
101	195	Italian cypress	*Cupressus sempervirens*	No	8	8	Measured	Healthy
102	173	Chinese photinia	*Photinia sp.*	No	4,1,2,2,3,3,1	16	Measured	Healthy

Tree Number	Field Tag	Common Name	Scientific Name	Native Status	Stem dbh (inch)	Total dbh (inch)	Measurement Type	Health
103	166	Washington fan palm	*Washingtonia robusta*	No	20	20	Measured	Healthy
104	172	Silver dollar gum	*Eucalyptus polyanthemos*	No	8	8	Measured	Healthy
105	171	Silver dollar gum	*Eucalyptus polyanthemos*	No	9	9	Measured	Stressed
106	170	Silver dollar gum	*Eucalyptus polyanthemos*	No	22	22	Measured	Healthy
107	169	Silver dollar gum	*Eucalyptus polyanthemos*	No	12	12	Measured	Healthy
108	168	Silver dollar gum	*Eucalyptus polyanthemos*	No	6	6	Measured	Stressed
109	167	Silver dollar gum	*Eucalyptus polyanthemos*	No	12	12	Measured	Stressed
110	165	Silver dollar gum	*Eucalyptus polyanthemos*	No	20	20	Measured	Stressed
111	164	Silver dollar gum	*Eucalyptus polyanthemos*	No	22	22	Measured	Stressed
112	163	Washington fan palm	*Washingtonia robusta*	No	20	20	Measured	Healthy
113	162	California nutmeg	*Torreya californica*	Yes	7,6,7,3	23	Measured	Healthy
114	161	Silver dollar gum	*Eucalyptus polyanthemos*	No	24	24	Measured	Stressed
115	160	Silver dollar gum	*Eucalyptus polyanthemos*	No	30	30	Measured	Stressed

Tree Number	Field Tag	Common Name	Scientific Name	Native Status	Stem dbh (inch)	Total dbh (inch)	Measurement Type	Health
116	159	Aleppo pine	*Pinus halepensis*	No	15	15	Measured	Stressed
117	158	Aleppo pine	*Pinus halepensis*	No	16	16	Measured	Stressed
118	157	California nutmeg	*Torreya californica*	Yes	4,4,2,3,2,2	17	Measured	Healthy
119	156	Aleppo pine	*Pinus halepensis*	No	12	12	Measured	Stressed
120	155	California nutmeg	*Torreya californica*	Yes	8,3,4,5	20	Measured	Healthy
121	154	Aleppo pine	*Pinus halepensis*	No	14	14	Measured	Stressed
122	153	California nutmeg	*Torreya californica*	Yes	14	14	Measured	Healthy
123	152	Aleppo pine	*Pinus halepensis*	No	10	10	Measured	Stressed
124	151	Aleppo pine	*Pinus halepensis*	No	18	18	Measured	Healthy
125	150	Aleppo pine	*Pinus halepensis*	No	18	18	Measured	Stressed
126	149	White alder	*Alnus rhombifolia*	Yes	7	7	Measured	Healthy
127	148	Blackwood acacia	*Acacia melanoxylon*	No	6	6	Measured	Healthy
128	147	White alder	*Alnus rhombifolia*	Yes	4	4	Measured	Stressed

Tree Number	Field Tag	Common Name	Scientific Name	Native Status	Stem dbh (inch)	Total dbh (inch)	Measurement Type	Health
129	146	Blackwood acacia	*Acacia melanoxylon*	No	7	7	Measured	Healthy
130	145	White alder	*Alnus rhombifolia*	Yes	9	9	Measured	Stressed
131	144	Blackwood acacia	*Acacia melanoxylon*	No	7	7	Measured	Stressed
132	143	White alder	*Alnus rhombifolia*	Yes	10	10	Measured	Healthy
133	142	White alder	*Alnus rhombifolia*	Yes	10	10	Measured	Healthy
134	140	White alder	*Alnus rhombifolia*	Yes	12	12	Measured	Healthy
135	141	White alder	*Alnus rhombifolia*	Yes	3,1	4	Measured	Stressed
136	120	Ash	*Fraxinus sp.*	Yes	4,3,3,3,3,4,3,2,1,1,2,1	30	Measured	Healthy
137	121	Ash	*Fraxinus sp.*	Yes	4,5,2,1,1,1	14	Measured	Healthy
138	139	London planetree	*Platanus hybrida*	No	14	14	Measured	Stressed
139	138	London planetree	*Platanus hybrida*	No	14	14	Measured	Healthy
140	137	London planetree	*Platanus hybrida*	No	10	10	Measured	Healthy
141	136	London planetree	*Platanus hybrida*	No	12	12	Measured	Healthy

Tree Number	Field Tag	Common Name	Scientific Name	Native Status	Stem dbh (inch)	Total dbh (inch)	Measurement Type	Health
142	135	London planetree	*Platanus hybrida*	No	11	11	Measured	Healthy
143	134	London planetree	*Platanus hybrida*	No	13	13	Measured	Stressed
144	133	London planetree	*Platanus hybrida*	No	12	12	Measured	Healthy
145	132	London planetree	*Platanus hybrida*	No	9	9	Measured	Stressed
146	131	London planetree	*Platanus hybrida*	No	15	15	Measured	Healthy
147	130	Pepper tree	*Schinus sp.*	No	5,5,4,3,2,1,1,2	23	Measured	Healthy
148	129	Pepper tree	*Schinus sp.*	No	6,4,3	13	Measured	Healthy
149	128	Pepper tree	*Schinus sp.*	No	8	8	Measured	Healthy
150	127	White alder	*Alnus rhombifolia*	Yes	20	20	Measured	Stressed
151	126	White alder	*Alnus rhombifolia*	Yes	11	11	Measured	Stressed
152	125	Pepper tree	*Schinus sp.*	No	6	6	Measured	Healthy
153	124	Pepper tree	*Schinus sp.*	No	5	5	Measured	Healthy
154	123	Aleppo pine	*Pinus halepensis*	No	24	24	Measured	Healthy

Tree Number	Field Tag	Common Name	Scientific Name	Native Status	Stem dbh (inch)	Total dbh (inch)	Measurement Type	Health
155	122	Aleppo pine	*Pinus halepensis*	No	18	18	Measured	Healthy
156	349	Mock orange	*Pittosporum tobira*	No	2,1,4,1,2,2,2	14	Measured	Healthy
157	348	Unknown shrub	*Rosaceae*	No	6,4,7,1,1	19	Measured	Healthy
158	347	Ash	*Fraxinus sp.*	Yes	2,3,4,4,5,4,3,2	27	Measured	Stressed
159	346	Ash	*Fraxinus sp.*	Yes	2,1,2,4,3,3,2,2	19	Measured	Stressed
160	345	Washington fan palm	*Washingtonia robusta*	No	10	10	Measured	Healthy
161	BW	Coast live oak	*Quercus agrifolia*	Yes	12	12	Estimated	Healthy
162	BV	Coast live oak	*Quercus agrifolia*	Yes	14	14	Estimated	Healthy
163	BU	Coast live oak	*Quercus agrifolia*	Yes	14	14	Estimated	Healthy
164	342	Coast live oak	*Quercus agrifolia*	Yes	6	6	Measured	Healthy
165	343	Coast live oak	*Quercus agrifolia*	Yes	6	6	Measured	Healthy
166	341	Coast live oak	*Quercus agrifolia*	Yes	10,10,8,6	34	Measured	Healthy
167	340	Coast live oak	*Quercus agrifolia*	Yes	6,8,1,2	17	Measured	Healthy
168	339	Coast live oak	*Quercus agrifolia*	Yes	3,2	5	Measured	Healthy

Tree Number	Field Tag	Common Name	Scientific Name	Native Status	Stem dbh (inch)	Total dbh (inch)	Measurement Type	Health
169	338	Valley oak	*Quercus lobata*	Yes	76	76	Measured	Healthy
170	BR	Elderberry	*Sambucus nigra*	Yes	3,4,3,4,4,4,6,8,10	46	Estimated	Healthy
171	337	Valley oak	*Quercus lobata*	Yes	2,2,2,2	8	Measured	Stressed
172	336	Washington fan palm	*Washingtonia robusta*	No	12	12	Measured	Healthy
173	BQ	Elderberry	*Sambucus nigra*	Yes	2,2,2,1,1,2	10	Estimated	Healthy
174	335	Coast live oak	*Quercus agrifolia*	Yes	2,4	6	Measured	Healthy
175	BS	Washington fan palm	*Washingtonia robusta*	No	10	10	Estimated	Healthy
176	BT	Coyote brush	*Baccharis pilularis*	Yes	2,2,2,2,2,2,2,2	16	Estimated	Healthy
177	344	Unknown pine	*Pinus sp.*	No	40	40	Measured	Dead
178	334	Washington fan palm	*Washingtonia robusta*	No	24	24	Measured	Healthy
179	AX	Silver dollar gum	*Eucalyptus polyanthemos*	No	22	22	Estimated	Healthy
180	AZ	Pepper tree	*Schinus sp.*	No	12	12	Estimated	Stressed
181	273	Elderberry	*Sambucus nigra*	Yes	11,8,3,3,6,8,4,6,5,1,1,1	57	Measured	Healthy
182	285	Holly oak	*Quercus ilex*	No	12,11,10,5,13,16,7,9,10,9,5	107	Measured	Healthy
183	AY	Redwood	*Sequoia sempervirens*	Yes	12	12	Estimated	Healthy

Tree Number	Field Tag	Common Name	Scientific Name	Native Status	Stem dbh (inch)	Total dbh (inch)	Measurement Type	Health
184	AY	Redwood	*Sequoia sempervirens*	Yes	12	12	Estimated	Healthy
185	AY	Redwood	*Sequoia sempervirens*	Yes	12	12	Estimated	Healthy
186	AY	Redwood	*Sequoia sempervirens*	Yes	12	12	Estimated	Healthy
187	AY	Redwood	*Sequoia sempervirens*	Yes	12	12	Estimated	Healthy
188	AY	Redwood	*Sequoia sempervirens*	Yes	12	12	Estimated	Healthy
189	AY	Redwood	*Sequoia sempervirens*	Yes	12	12	Estimated	Healthy
190	AY	Redwood	*Sequoia sempervirens*	Yes	12	12	Estimated	Healthy
191	AY	Redwood	*Sequoia sempervirens*	Yes	12	12	Estimated	Healthy
192	AY	Redwood	*Sequoia sempervirens*	Yes	12	12	Estimated	Healthy
193	AY	Redwood	*Sequoia sempervirens*	Yes	12	12	Estimated	Healthy
194	AY	Redwood	*Sequoia sempervirens*	Yes	12	12	Estimated	Healthy
195	AY	Redwood	*Sequoia sempervirens*	Yes	12	12	Estimated	Healthy
196	AY	Redwood	*Sequoia sempervirens*	Yes	12	12	Estimated	Healthy
197	AY	Redwood	*Sequoia sempervirens*	Yes	12	12	Estimated	Healthy
198	AY	Redwood	*Sequoia sempervirens*	Yes	12	12	Estimated	Healthy
199	274	Holly oak	*Quercus ilex*	No	5	5	Measured	Healthy
200	275	Fremont cottonwood	*Populus fremontii*	Yes	28,9	37	Measured	Healthy
201	276	Arroyo willow	*Salix lasiolepis*	Yes	28,20,18,20,18	107	Measured	Healthy
202	BP	Chinese photinia	*Photinia sp.*	No	2,3,4	9	Estimated	Healthy
203	BP	Chinese photinia	*Photinia sp.*	No	2,2,2,1	7	Estimated	Healthy

Tree Number	Field Tag	Common Name	Scientific Name	Native Status	Stem dbh (inch)	Total dbh (inch)	Measurement Type	Health
204	333	Arroyo willow	*Salix lasiolepis*	Yes	10,6	16	Measured	Healthy
205	BO	Arroyo willow	*Salix lasiolepis*	Yes	34,30	64	Estimated	Healthy
206	332	Arroyo willow	*Salix lasiolepis*	Yes	12	12	Measured	Healthy
207	BN	Holly oak	*Quercus ilex*	No	2	2	Estimated	Healthy
208	BM	Fremont cottonwood	*Populus fremontii*	Yes	20,20,30	70	Estimated	Healthy
209	BL	Holly oak	*Quercus ilex*	No	12	12	Estimated	Healthy
210	BK	Coast live oak	*Quercus agrifolia*	Yes	4	4	Estimated	Healthy
211	BJ	Chinese photinia	*Photinia sp.*	No	2,2,2,2,3,3	14	Estimated	Healthy
212	BJ	Chinese photinia	*Photinia sp.*	No	4,2,2	8	Estimated	Healthy
213	BJ	Chinese photinia	*Photinia sp.*	No	6	6	Estimated	Healthy
214	331	Arroyo willow	*Salix lasiolepis*	Yes	8,6	14	Measured	Healthy
215	BI	Chinese photinia	*Photinia sp.*	No	2,3,1	6	Estimated	Healthy
216	330	Arroyo willow	*Salix lasiolepis*	Yes	12,8,36,2,2,3,1,1,1	66	Measured	Healthy
217	BH	Chinese photinia	*Photinia sp.*	No	2,4,2,2,1,1,1	13	Estimated	Healthy
218	329	Holly oak	*Quercus ilex*	No	12	12	Measured	Healthy
219	328	Holly oak	*Quercus ilex*	No	2,2,1,1	6	Measured	Healthy
220	327	Holly oak	*Quercus ilex*	No	3,1,1,1	6	Measured	Healthy

Tree Number	Field Tag	Common Name	Scientific Name	Native Status	Stem dbh (inch)	Total dbh (inch)	Measurement Type	Health
221	326	Holly oak	*Quercus ilex*	No	3	3	Measure d	Healthy
222	325	Fremont cottonwood	*Populus fremontii*	Yes	42,12,2,1,1,1	59	Measure d	Healthy
223	324	Coast live oak	*Quercus agrifolia*	Yes	2	2	Measure d	Healthy
224	323	Fremont cottonwood	*Populus fremontii*	Yes	12,14	26	Measure d	Healthy
225	322	Silk tree	*Albizia julibrissin*	No	20,26	46	Measure d	Healthy
226	321	Holly oak	*Quercus ilex*	No	24	24	Measure d	Healthy
227	320	Coast live oak	*Quercus agrifolia*	Yes	34	34	Measure d	Healthy
228	319	Holly oak	*Quercus ilex*	No	8	8	Measure d	Healthy
229	318	Holly oak	*Quercus ilex*	No	10	10	Measure d	Healthy
230	316	Holly oak	*Quercus ilex*	No	2	2	Measure d	Healthy
231	317	Holly oak	*Quercus ilex*	No	12	12	Measure d	Healthy
232	315	Holly oak	*Quercus ilex*	No	3	3	Measure d	Healthy
233	314	Holly oak	*Quercus ilex*	No	16	16	Measure d	Healthy

Tree Number	Field Tag	Common Name	Scientific Name	Native Status	Stem dbh (inch)	Total dbh (inch)	Measurement Type	Health
234	313	Holly oak	*Quercus ilex*	No	6,6,4,4,6,6,6,8,8,4	58	Measured	Healthy
235	312	Holly oak	*Quercus ilex*	No	10,6	16	Measured	Healthy
236	310	Holly oak	*Quercus ilex*	No	6	6	Measured	Healthy
237	311	Holly oak	*Quercus ilex*	No	10	10	Measured	Healthy
238	309	Holly oak	*Quercus ilex*	No	8,6,10,14,6,6	50	Measured	Healthy
239	308	Holly oak	*Quercus ilex*	No	24	24	Measured	Healthy
240	BG	Tulip tree	*Liriodendron tulipifera*	No	10	10	Estimated	Stressed
241	BF	Washington fan palm	*Washingtonia robusta*	No	18,6	24	Estimated	Healthy
242	BE	Washington fan palm	*Washingtonia robusta*	No	18	18	Estimated	Healthy
243	BD	Washington fan palm	*Washingtonia robusta*	No	18	18	Estimated	Healthy
244	BC	Washington fan palm	*Washingtonia robusta*	No	18	18	Estimated	Dead
245	271	Weeping juniper	*Juniperus scopulorum*	No	18,8	26	Measured	Stressed
246	AW	Olive	*Olea europaea*	No	6,6,4	16	Estimated	Healthy

Tree Number	Field Tag	Common Name	Scientific Name	Native Status	Stem dbh (inch)	Total dbh (inch)	Measurement Type	Health
247	AV	Apple	*Malus sp.*	No	10	10	Estimated	Stressed
248	AU	Washington fan palm	*Washingtonia robusta*	No	20	20	Estimated	Healthy
249	AU	Washington fan palm	*Washingtonia robusta*	No	20	20	Estimated	Healthy
250	AU	Washington fan palm	*Washingtonia robusta*	No	20	20	Estimated	Healthy
251	AT	Olive	*Olea europaea*	No	6,6	12	Estimated	Healthy
252	AS	Aleppo pine	*Pinus halepensis*	No	16	16	Estimated	Stressed
253	AR	Aleppo pine	*Pinus halepensis*	No	16	16	Estimated	Stressed
254	AQ	Aleppo pine	*Pinus halepensis*	No	16	16	Estimated	Stressed
255	AP	Aleppo pine	*Pinus halepensis*	No	12	12	Estimated	Stressed
256	AO	Washington fan palm	*Washingtonia robusta*	No	12	12	Estimated	Stressed
257	AN	Aleppo pine	*Pinus halepensis*	No	20	20	Estimated	Stressed
258	AM	Aleppo pine	*Pinus halepensis*	No	16	16	Estimated	Stressed
259	AL	Aleppo pine	*Pinus halepensis*	No	16	16	Estimated	Stressed

Tree Number	Field Tag	Common Name	Scientific Name	Native Status	Stem dbh (inch)	Total dbh (inch)	Measurement Type	Health
260	AK	Aleppo pine	*Pinus halepensis*	No	20	20	Estimated	Stressed
261	AJ	Aleppo pine	*Pinus halepensis*	No	16	16	Estimated	Stressed
262	AI	Aleppo pine	*Pinus halepensis*	No	14	14	Estimated	Stressed
263	AH	Olive	*Olea europaea*	No	12,12, 8,1,1,1	35	Estimated	Stressed
264	AG	Red ironbark	*Eucalyptus sideroxylon*	No	12, 12,10,10	44	Estimated	Stressed
265	AF	Red ironbark	*Eucalyptus sideroxylon*	No	12,10,8,8,6,2,1	47	Estimated	Stressed
266	AE	Red ironbark	*Eucalyptus sideroxylon*	No	6,8,6,8,10	38	Estimated	Stressed
267	AD	Red ironbark	*Eucalyptus sideroxylon*	No	12,10,10,10	42	Estimated	Stressed
268	AC	Red ironbark	*Eucalyptus sideroxylon*	No	10, 6,6,6,8,8	44	Estimated	Stressed
269	AB	Red ironbark	*Eucalyptus sideroxylon*	No	10,2,2,2,2,2,1	21	Estimated	Stressed
270	AA	Red ironbark	*Eucalyptus sideroxylon*	No	8,6,4	18	Estimated	Stressed
271	Z	Aleppo pine	*Pinus halepensis*	No	24	24	Estimated	Healthy
272	Y	Aleppo pine	*Pinus halepensis*	No	16	16	Estimated	Stressed

Tree Number	Field Tag	Common Name	Scientific Name	Native Status	Stem dbh (inch)	Total dbh (inch)	Measurement Type	Health
273	X	Aleppo pine	*Pinus halepensis*	No	16	16	Estimated	Stressed
274	W	Aleppo pine	*Pinus halepensis*	No	16	16	Estimated	Stressed
275	V	Aleppo pine	*Pinus halepensis*	No	16	16	Estimated	Stressed
276	U	Olive	*Olea europaea*	No	6	6	Estimated	Healthy
277	T	Aleppo pine	*Pinus halepensis*	No	16	16	Estimated	Stressed
278	S	Aleppo pine	*Pinus halepensis*	No	12	12	Estimated	Stressed
279	R	Aleppo pine	*Pinus halepensis*	No	16	16	Estimated	Stressed
280	Q	Aleppo pine	*Pinus halepensis*	No	16	16	Estimated	Stressed
281	P	Aleppo pine	*Pinus halepensis*	No	22	22	Estimated	Healthy
282	O	Unknown dead tree	*Unknown*	Unknown	6	6	Estimated	Dead
283	286	Chinese photinia	*Photinia sp.*	No	3	3	Measured	Healthy
284	N	Tulip tree	*Liriodendron tulipifera*	No	18	18	Estimated	Stressed
285	287	Washington fan palm	*Washingtonia robusta*	No	22	22	Measured	Healthy
286	198	Monterey pine	*Pinus radiata*	Yes	18	18	Measured	Stressed

Tree Number	Field Tag	Common Name	Scientific Name	Native Status	Stem dbh (inch)	Total dbh (inch)	Measurement Type	Health
287	196	Holly oak	*Quercus ilex*	No	3,3	6	Measured	Healthy
288	197	Coast live oak	*Quercus agrifolia*	Yes	8,8,6	22	Measured	Healthy
289	201	Manzanita	*Arctostaphylos sp.*	Yes	1,1,1,2,1,1,1,1,1	10	Measured	Dead
290	202	Olive	*Olea europaea*	No	9	9	Measured	Healthy
291	203	Manzanita	*Arctostaphylos sp.*	Yes	2,2,1,2,1,1	9	Measured	Stressed
292	204	Manzanita	*Arctostaphylos sp.*	Yes	4,3,3,2,1,1	14	Measured	Stressed
293	205	Unknown pine	*Pinus sp.*	No	3	3	Measured	Healthy
294	206	Coast live oak	*Quercus agrifolia*	Yes	3,2,1,1,2	9	Measured	Healthy
295	207	Manzanita	*Arctostaphylos sp.*	Yes	2,1,1,1,1,1	7	Measured	Stressed
296	208	Lollypop tree	*Myoporum laetum*	No	10,10,5,6	31	Measured	Stressed
297	210	Lollypop tree	*Myoporum laetum*	No	6,1	7	Measured	Stressed
298	209	Lollypop tree	*Myoporum laetum*	No	7,4,3,4,6,5,5,6,4	43	Measured	Stressed
299	211	Lollypop tree	*Myoporum laetum*	No	9,5,1,1,1,3	20	Measured	Stressed

Tree Number	Field Tag	Common Name	Scientific Name	Native Status	Stem dbh (inch)	Total dbh (inch)	Measurement Type	Health
300	212	Lollypop tree	*Myoporum laetum*	No	6,4,4,4,2,3,4,4,3,4,2,3	43	Measured	Stressed
301	213	Lollypop tree	*Myoporum laetum*	No	5,4,3,4,3,3,1,4,2,3,1,2	35	Measured	Stressed
302	214	Lollypop tree	*Myoporum laetum*	No	4,5,2,3,1,1,1,1	18	Measured	Stressed
303	218	Lollypop tree	*Myoporum laetum*	No	4,1	5	Measured	Stressed
304	219	Lollypop tree	*Myoporum laetum*	No	3,1,1,1	6	Measured	Dead
305	215	Lollypop tree	*Myoporum laetum*	No	6,1,3,5,3,2,4,6,2,3,2,3,3,1	44	Measured	Stressed
306	217	Lollypop tree	*Myoporum laetum*	No	5,6	11	Measured	Stressed
307	216	Lollypop tree	*Myoporum laetum*	No	8,9,2,3,4,4	30	Measured	Stressed
308	220	Lollypop tree	*Myoporum laetum*	No	6,5,3,4,2,1,1	22	Measured	Stressed
309	221	Lollypop tree	*Myoporum laetum*	No	4	4	Measured	Stressed
310	222	Lollypop tree	*Myoporum laetum*	No	3	3	Measured	Dead
311	223	Lollypop tree	*Myoporum laetum*	No	4	4	Measured	Stressed
312	224	Lollypop tree	*Myoporum laetum*	No	3,8,2,2,4,2	21	Measured	Stressed

Tree Number	Field Tag	Common Name	Scientific Name	Native Status	Stem dbh (inch)	Total dbh (inch)	Measurement Type	Health
313	235	Lollypop tree	*Myoporum laetum*	No	2,1	3	Measured	Healthy
314	226	Chinese pistachio	*Pistacia chinensis*	No	3,5,4,4	16	Measured	Stressed
315	227	Chinese pistachio	*Pistacia chinensis*	No	2,1,1,1,1,1,1,1,1,1,1	12	Measured	Stressed
316	M	Ash	*Fraxinus sp.*	Yes	3,1,1,1	6	Estimated	Stressed
317	M	Chinese photinia	*Photinia sp.*	No	2,1,1,1,1	6	Estimated	Stressed
318	228	Canary Island pine	*Pinus canariensis*	No	3	3	Measured	Healthy
319	272	Blackwood acacia	*Acacia melanoxylon*	No	14,6,12,2,1,1,1,1	38	Measured	Healthy
320	229	Chinese pistachio	*Pistacia chinensis*	No	5	5	Measured	Stressed
321	230	Blackwood acacia	*Acacia melanoxylon*	No	3	3	Measured	Healthy
322	231	Chinese pistachio	*Pistacia chinensis*	No	4,3,2,1	10	Measured	Healthy
323	232	Chinese pistachio	*Pistacia chinensis*	No	2,4,2,2,3,1,1,2	17	Measured	Healthy
324	233	Lollypop tree	*Myoporum laetum*	No	4,2,2,2,4,1,2,1,4,5,3,3,2,1,3,1,2,2,4,3,2,2,2,1,3	61	Measured	Stressed
325	234	Lollypop tree	*Myoporum laetum*	No	4,4,2,1,1,1,2,3,4,2,5,4,3,2,1	41	Measured	Stressed

Tree Number	Field Tag	Common Name	Scientific Name	Native Status	Stem dbh (inch)	Total dbh (inch)	Measurement Type	Health
326	235	Lollypop tree	*Myoporum laetum*	No	8,6,4,4,2,1,3,2,4,2,2,1,6,8,4,6,5,2,3,4,4	81	Measured	Stressed
327	236	Lollypop tree	*Myoporum laetum*	No	6,5,5,3,3,2,2,4,5,6,4,4,2,1,3	55	Measured	Stressed
328	237	Lollypop tree	*Myoporum laetum*	No	4,4,4,2,2,2,2,4,3,4,4,2,2,4,2,1,4	50	Measured	Stressed
329	238	Chinese pistachio	*Pistacia chinensis*	No	3,2,2,3,4,1	15	Measured	Stressed
330	239	Chinese pistachio	*Pistacia chinensis*	No	4,4,4,3,3,3,4	28	Measured	Stressed
331	L	Olive	*Olea europaea*	No	2	2	Estimated	Healthy
332	243	Manzanita	*Arctostaphylos sp.*	Yes	2,2,2,3,3	12	Measured	Stressed
333	240	Chinese pistachio	*Pistacia chinensis*	No	4,2,2,2,1,2	13	Measured	Stressed
334	241	Olive	*Olea europaea*	No	4	4	Measured	Healthy
335	242	Olive	*Olea europaea*	No	2,2,2	6	Measured	Healthy
336	A	Olive	*Olea europaea*	No	3	3	Estimated	Healthy
337	A	Olive	*Olea europaea*	No	2,1,1	4	Estimated	Healthy
338	B	Ash	*Fraxinus sp.*	Yes	3,3,3	9	Estimated	Healthy
339	C	Olive	*Olea europaea*	No	3,2	5	Estimated	Healthy
340	C	Olive	*Olea europaea*	No	3	3	Estimated	Healthy
341	D	Manzanita	*Arctostaphylos sp.*	Yes	2,3,3,2	10	Estimated	Healthy

Tree Number	Field Tag	Common Name	Scientific Name	Native Status	Stem dbh (inch)	Total dbh (inch)	Measurement Type	Health
342	D	Manzanita	*Arctostaphylos sp.*	Yes	2,3,3,2	10	Estimated	Healthy
343	244	Chinese pistachio	*Pistacia chinensis*	No	6,6,4,5,2,3,3,2,1	32	Measured	Stressed
344	E	Chinese photinia	*Photinia sp.*	No	3,3,2	8	Estimated	Healthy
345	E	Chinese photinia	*Photinia sp.*	No	2	2	Estimated	Healthy
346	F	Carob tree	*Ceratonia siliqua*	No	12	12	Estimated	Healthy
347	G	Manzanita	*Arctostaphylos sp.*	Yes	2,2,2	6	Estimated	Healthy
348	H	Ash	*Fraxinus sp.*	Yes	4	4	Estimated	Healthy
349	245	Chinese photinia	*Photinia sp.*	No	2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2	50	Measured	Stressed
350	246	Holly oak	*Quercus ilex*	No	6	6	Measured	Healthy
351	247	Holly oak	*Quercus ilex*	No	3	3	Measured	Stressed
352	248	Holly oak	*Quercus ilex*	No	4	4	Measured	Healthy
353	K	Carob tree	*Ceratonia siliqua*	No	16,10	26	Estimated	Healthy
354	I	Carob tree	*Ceratonia siliqua*	No	10,5,3,3,3,3,3,3	33	Estimated	Healthy
355	249	Coast live oak	*Quercus agrifolia*	Yes	16,3	19	Measured	Healthy
356	J	Carob tree	*Ceratonia siliqua*	No	10,10,8,6	34	Estimated	Healthy
357	250	Holly oak	*Quercus ilex*	No	4,2	6	Measured	Healthy
358	251	Black poui	*Jacaranda mimosifolia*	No	14,8	22	Measured	Healthy

Tree Number	Field Tag	Common Name	Scientific Name	Native Status	Stem dbh (inch)	Total dbh (inch)	Measurement Type	Health
359	252	Ash	*Fraxinus sp.*	Yes	3,2	5	Measured	Stressed
360	253	Carob tree	*Ceratonia siliqua*	No	6,4,8,10	28	Measured	Stressed
361	254	Ash	*Fraxinus sp.*	Yes	2	2	Measured	Stressed
362	255	Weeping juniper	*Juniperus scopulorum*	No	8	8	Measured	Stressed
363	256	Horsetail tree	*Casuarina equisetifolia*	No	44	44	Measured	Healthy
364	257	Weeping juniper	*Juniperus scopulorum*	No	6,2,2	10	Measured	Stressed
365	258	Horsetail tree	*Casuarina equisetifolia*	No	18	18	Measured	Healthy
366	259	Weeping juniper	*Juniperus scopulorum*	No	16	16	Measured	Stressed
367	260	Horsetail tree	*Casuarina equisetifolia*	No	32	32	Measured	Healthy
368	261	Horsetail tree	*Casuarina equisetifolia*	No	36	36	Measured	Healthy
369	262	Horsetail tree	*Casuarina equisetifolia*	No	36	36	Measured	Stressed
370	263	Weeping juniper	*Juniperus scopulorum*	No	9	9	Measured	Dead
371	264	Horsetail tree	*Casuarina equisetifolia*	No	23	23	Measured	Healthy

Tree Number	Field Tag	Common Name	Scientific Name	Native Status	Stem dbh (inch)	Total dbh (inch)	Measurement Type	Health
372	265	Horsetail tree	*Casuarina equisetifolia*	No	40	40	Measured	Stressed
373	266	Horsetail tree	*Casuarina equisetifolia*	No	34	34	Measured	Stressed
374	267	Horsetail tree	*Casuarina equisetifolia*	No	34	34	Measured	Healthy
375	268	Horsetail tree	*Casuarina equisetifolia*	No	50	50	Measured	Stressed
376	269	Olive	*Olea europaea*	No	2,1,1,1	5	Measured	Healthy
377	270	Weeping juniper	*Juniperus scopulorum*	No	12	12	Measured	Stressed
378	BB	Coast live oak	*Quercus agrifolia*	Yes	6	6	Estimated	Healthy
379	BB	Coast live oak	*Quercus agrifolia*	Yes	4	4	Estimated	Healthy
380	BB	Coast live oak	*Quercus agrifolia*	Yes	3	3	Estimated	Healthy
381	BB	Coast live oak	*Quercus agrifolia*	Yes	2	2	Estimated	Healthy
382	306	Coast live oak	*Quercus agrifolia*	Yes	10	10	Measured	Healthy
383	307	Coast live oak	*Quercus agrifolia*	Yes	6,6,6	18	Measured	Stressed
384	305	Coast live oak	*Quercus agrifolia*	Yes	3	3	Measured	Healthy
385	304	Coast live oak	*Quercus agrifolia*	Yes	4	4	Measured	Healthy
386	301	Coast live oak	*Quercus agrifolia*	Yes	2	2	Measured	Healthy

Tree Number	Field Tag	Common Name	Scientific Name	Native Status	Stem dbh (inch)	Total dbh (inch)	Measurement Type	Health
387	302	Coast live oak	*Quercus agrifolia*	Yes	18	18	Measured	Healthy
388	303	Coast live oak	*Quercus agrifolia*	Yes	16	16	Measured	Healthy
389	299	Coast live oak	*Quercus agrifolia*	Yes	3	3	Measured	Healthy
390	300	Coast live oak	*Quercus agrifolia*	Yes	6,6,6,6	24	Measured	Healthy
391	298	Coast live oak	*Quercus agrifolia*	Yes	10	10	Measured	Healthy
392	297	Coast live oak	*Quercus agrifolia*	Yes	8,8,4	20	Measured	Stressed
393	294	Coast live oak	*Quercus agrifolia*	Yes	6	6	Measured	Healthy
394	BA	Holly oak	*Quercus ilex*	No	5	5	Estimated	Healthy
395	BA	Holly oak	*Quercus ilex*	No	5	5	Estimated	Healthy
396	BA	Holly oak	*Quercus ilex*	No	5	5	Estimated	Healthy
397	BA	Holly oak	*Quercus ilex*	No	5	5	Estimated	Healthy
398	BA	Holly oak	*Quercus ilex*	No	5	5	Estimated	Healthy
399	BA	Holly oak	*Quercus ilex*	No	5	5	Estimated	Healthy
400	BA	Holly oak	*Quercus ilex*	No	5	5	Estimated	Healthy
401	BA	Holly oak	*Quercus ilex*	No	5	5	Estimated	Healthy
402	BA	Holly oak	*Quercus ilex*	No	5	5	Estimated	Healthy
403	BA	Holly oak	*Quercus ilex*	No	5	5	Estimated	Healthy

Tree Number	Field Tag	Common Name	Scientific Name	Native Status	Stem dbh (inch)	Total dbh (inch)	Measurement Type	Health
404	BA	Holly oak	*Quercus ilex*	No	5	5	Estimated	Healthy
405	BA	Holly oak	*Quercus ilex*	No	5	5	Estimated	Healthy
406	BA	Holly oak	*Quercus ilex*	No	2	2	Estimated	Healthy
407	BA	Holly oak	*Quercus ilex*	No	2	2	Estimated	Healthy
408	BA	Holly oak	*Quercus ilex*	No	2	2	Estimated	Healthy
409	BA	Holly oak	*Quercus ilex*	No	2	2	Estimated	Healthy
410	BA	Holly oak	*Quercus ilex*	No	2	2	Estimated	Healthy
411	BA	Holly oak	*Quercus ilex*	No	2	2	Estimated	Healthy
412	BA	Holly oak	*Quercus ilex*	No	2	2	Estimated	Healthy
413	BA	Holly oak	*Quercus ilex*	No	2	2	Estimated	Healthy
414	BA	Holly oak	*Quercus ilex*	No	2	2	Estimated	Healthy
415	BA	Holly oak	*Quercus ilex*	No	2	2	Estimated	Healthy
416	BA	Holly oak	*Quercus ilex*	No	2	2	Estimated	Healthy
417	296	Coast live oak	*Quercus agrifolia*	Yes	8,8	16	Measured	Stressed
418	295	Coast live oak	*Quercus agrifolia*	Yes	8	8	Measured	Stressed
419	288	Coast live oak	*Quercus agrifolia*	Yes	2	2	Measured	Healthy
420	289	Coast live oak	*Quercus agrifolia*	Yes	3	3	Measured	Healthy
421	290	Coast live oak	*Quercus agrifolia*	Yes	5	5	Measured	Healthy

Tree Number	Field Tag	Common Name	Scientific Name	Native Status	Stem dbh (inch)	Total dbh (inch)	Measurement Type	Health
422	291	Coast live oak	*Quercus agrifolia*	Yes	2	2	Measured	Healthy
423	292	Coast live oak	*Quercus agrifolia*	Yes	4	4	Measured	Healthy
424	293	Coast live oak	*Quercus agrifolia*	Yes	4	4	Measured	Stressed
425	283	Coast live oak	*Quercus agrifolia*	Yes	8	8	Measured	Healthy
426	284	Coast live oak	*Quercus agrifolia*	Yes	6,2	8	Measured	Healthy
427	282	Fremont cottonwood	*Populus fremontii*	Yes	40,24,20,10,18,24,18	124	Measured	Healthy
428	281	Fremont cottonwood	*Populus fremontii*	Yes	18	18	Measured	Stressed
429	279	Fremont cottonwood	*Populus fremontii*	Yes	10,3,14	27	Measured	Stressed
430	280	Fremont cottonwood	*Populus fremontii*	Yes	20,8	28	Measured	Stressed
431	278	Fremont cottonwood	*Populus fremontii*	Yes	40,14,12,20	86	Measured	Stressed
432	277	Fremont cottonwood	*Populus fremontii*	Yes	44,32,8,10,18	112	Measured	Stressed

H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 1a. Tree and Shrub Map
Upper Berryessa Creek (3270-52)
July 2015

Figure 1b. Tree and Shrub Map

Upper Berryessa Creek (3270-52)

July 2015

H. T. HARVEY & ASSOCIATES
Ecological Consultants

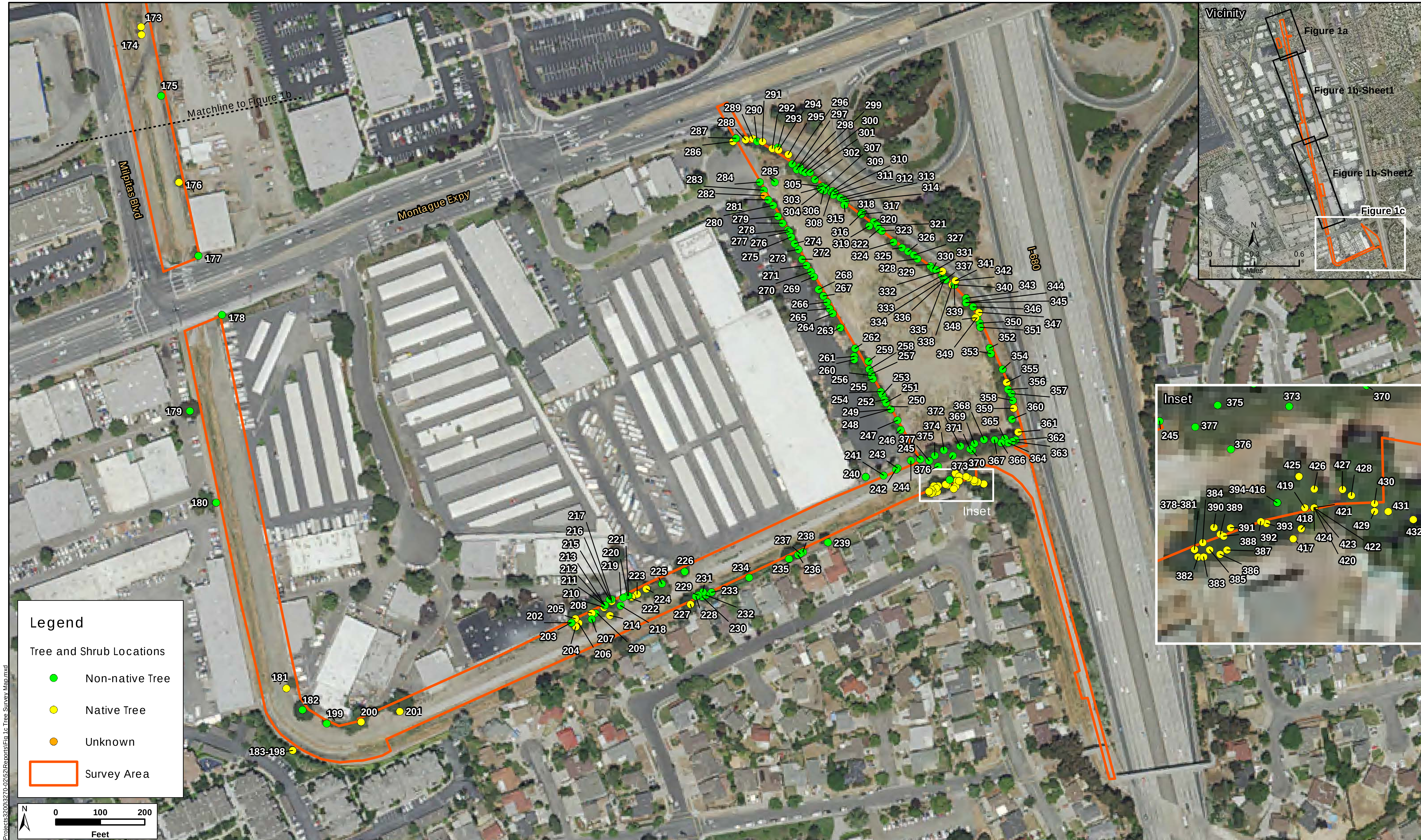


Figure 1c. Tree and Shrub Map
Upper Berryessa Creek (3270-52)
July 2015

H. T. HARVEY & ASSOCIATES
Ecological Consultants

Appendix G: Public Comments on the DEIR

Letter No. 1

Santa Clara County Parks and Recreation Department

Date Received: 10/2/2015

County of Santa Clara

Parks and Recreation Department

298 Garden Hill Drive
Los Gatos, California 95032-7669
(408) 355-2200 FAX 355-2290
Reservations (408) 355-2201
www.parkhere.org

October 2, 2015

James Manitakos, Environmental Planner II
Santa Clara Valley Water District, D-2017
5750 Almaden Expressway
San Jose CA 95118

Subject: **Notice of Completion, Draft Environmental Impact Report**

Project: **Upper Berryessa Creek Flood Risk Management Project**

Dear Mr. Manitakos,

The County of Santa Clara Parks and Recreation Department has reviewed the Draft Environmental Impact Report for the Upper Berryessa Creek Flood Risk Management Project and offers the following comments to be considered.

Section 3.10: Land Use and Planning
As described on page 3-128 of the DEIR, the entire length of the project area is a planned multiple-use recreational trail alignment (Berryessa Creek Trail) as adopted by the City of Milpitas in the *Milpitas Trails Master Plan* (1997), *Bikeway Master Plan Update* (2009), and the *General Plan*. A multiple-use trail along this creek corridor is also consistent with the goals and policies of the *Santa Clara Countywide Trails Master Plan* (1995) which includes goals and policies for multi-agency collaboration for implementation of trail projects of regional significance, such as the Berryessa Creek Trail.

The project description does not include recreational trail improvements along the creek channel. Because of the project's lack of a trail component, as described on page 3-129, "the proposed project would conflict with the Milpitas Trails Master Plan, which would be a significant impact." To mitigate this impact, mitigation measure LND-A would require that the District work with the City of Milpitas to allow public trail access through a Joint Use Agreement.

For the purposes of regional trail planning, and establishing an interconnected regional multi-use trail system, it is important to consider the development of the proposed trail alignment in the future.

Thank you for your consideration.

Sincerely,

Will Fourt
Park Planner III

CC: Kimberly Brosseau, Acting Principal Planner
Aruna Bodduna, County Roads & Airports Department

Letter No. 2

California Department of Transportation (Caltrans)

Date Received: 11/10/2015

STATE OF CALIFORNIA—CALIFORNIA STATE TRANSPORTATION AGENCY EDMUND G. BROWN Jr., Governor

DEPARTMENT OF TRANSPORTATION
DISTRICT 4
P.O. BOX 23660
OAKLAND, CA 94623-0660
PHONE (510) 286-5528
FAX (510) 286-5559
TTY 711
www.dot.ca.gov

Serious Drought.
Help save water!

SCVWD NOV10'15AM11:18

November 10, 2015

SCL000140
SCL/GEN/PM VAR
SCH# 2001104013

Mr. James Manitakos
Santa Clara Valley Water District
5750 Alameda Expressway
San Jose, CA 95118

Dear Mr. Manitakos:

Upper Berryessa Creek Flood Risk Management Project – Draft Environmental Impact Report

Thank you for continuing to include the California Department of Transportation (Caltrans) in the environmental review process for the project referenced above. The mission of Caltrans is to provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability. Caltrans has reviewed the Draft Environmental Impact Report (DEIR) to ensure consistency with its mission and state planning priorities of infill, conservationism, and efficient development. Please refer to the previous comment letters on this project. Caltrans provides these comments consistent with the State's smart mobility goals to support a vibrant economy and build communities, not sprawl.

Project Understanding

The project addresses potential impacts of the proposed Upper Berryessa Creek Flood Risk Management Project within the cities of Milpitas and San Jose, running from under Interstate (I-) 680 south of the I-680/Montague Expressway interchange and to the north along I-680 approximately one-half mile to the west. Proposed channel modifications include flood risk improvements along 2.2 miles of Upper Berryessa Creek. The proposed project has been designed to provide flood damage reduction benefits along Upper Berryessa Creek from the overpass of I-680 in the City of San Jose to the upstream side of Calaveras Boulevard in the City of Milpitas.

Lead Agency

As the lead agency, the Santa Clara Valley Water District (SCVWD) is responsible for all project mitigation, including any needed improvements to State highways. The project's fair share contribution, financing, scheduling, implementation responsibilities and lead agency monitoring should be fully discussed for all proposed mitigation measures.

Hydraulics

1. Floodwall Cross Sections: Please clarify whether the corresponding floodwall typical cross sections have been updated to include the new wall extension. The original proposed floodwall will be extended from 1,300 feet (-ft) to 2,200-ft along the west bank in Reaches 2 and 3 with a wall extension from "roughly the Piedmont Creek confluence to 1,500 feet upstream of Los Coches street". Figures 5.1, 5.2 and 5.3 show the original typical cross sections for alternatives 2A, 2B and 4. Figure 2.7 shows the typical cross sections for the revised project. It appears both Figures 2.7 and 5.1 show the same floodwall limits unchanged from stations 103+50 to 116+23.43 (1273-ft).
2. Figures 2.7 and 5.1: Please clarify why the 450-ft second floodwall in Reach 4 (171+00 to 175+50) was shown on Figure 5.1 (alternative 2A sections, south of Montague Expressway) but not on the revised typical cross sections of Figure 2.7.
3. Federal Emergency Management Agency (FEMA) Flood Map: The DEIR states that the proposed project would remove an estimated 500 parcels of land from the flood hazard zone. Caltrans recommends that the FEMA flood map be included in the DEIR with an exhibit showing the approximate areas where flood hazard will be lifted.
4. Fourth sentence of the third paragraph of Section 3.17.2.2 (p. 3-189): This sentence states, "Numerous storm drains empty into the system…." It is unclear the kind of "storm drains" being referred to and discharged into which "system" (i.e., is the "system" referring to the channels/creek or the drainage systems as a whole?). Please clarify in the DEIR which storm drains and system.
5. Page 3-190 of Section 3.17.2.2, Hydrology and Flooding: This section describes the existing conditions as "there is essentially no floodplain" for Reaches 1-3 and "almost complete disconnection from the floodplain" for Reach 4. Based on Figure 2.4, it appears that the floodplain mainly contained in the channel and overtops to the surrounding area with the depth less than 1 foot during a 100-yr flood event.

Encroachment Permit

Please be advised that any work or traffic control that encroaches onto the State ROW requires an encroachment permit that is issued by Caltrans. To apply, a completed encroachment permit application, environmental documentation, and five (5) sets of plans clearly indicating State ROW must be submitted to: David Salladay, District Office Chief, Office of Permits, California Department of Transportation, District 4, P.O. Box 23660, Oakland, CA 94623-0660. Traffic-related mitigation measures should be incorporated into the construction plans prior to the encroachment permit process. See this website for more information: www.dot.ca.gov/hq/traffops/developserv/permits.

Should you have any questions regarding this letter, please contact Brian Ashurst at (510) 286-5505 or brian.ashurst@dot.ca.gov.

Sincerely,

Pat

PATRICIA MAURICE
District Branch Chief
Local Development - Intergovernmental Review

c: Scott Morgan, State Clearinghouse
Tyler Stalker, U.S. Army Corps of Engineers – facsimile (916) 323-3018
Robert Swierk, Santa Clara Valley Transportation Authority (VTA) – electronic copy
Robert Cunningham, Santa Clara Valley Transportation Authority (VTA) – electronic copy

Letter No. 3

San Francisco Bay Regional Water Quality Control Board

Date Received: 11/12/2015

CALIFORNIA
Water Boards

EDMUND G. BROWN JR.
GOVERNOR

MATTHEW RODRIQUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

San Francisco Bay Regional Water Quality Control Board

Sent via electronic mail: No hard copy to follow

November 12, 2015
CIWQS Place ID 818597 (SG)
Regulatory Measure ID 403119

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3686

Attention: Mr. James Manitakos
Email: JManitakos@valleywater.org

Subject: Comments on the Draft Environmental Impact Report for Upper Berryessa Creek Flood Risk Management Project, Santa Clara County, SCH No. 2001104013

Dear Mr. Manitakos:

San Francisco Bay Regional Water Quality Control Board (Water Board) staff has reviewed the *Public Review Draft Environmental Impact Report for the Upper Berryessa Creek Flood Risk Management Project (State Clearinghouse No. 2001104013)* (DEIR) prepared by the Santa Clara Valley Water District (District) pursuant to the California Environmental Quality Act (CEQA). The project purpose is to convey the 1 percent exceedance probability flood event in Berryessa Creek from U.S. Interstate 680 in the City of San Jose for 2.2 miles downstream to Calaveras Boulevard in the City of Milpitas (Project).

The District is the local sponsor for the Project that the U.S. Army Corps of Engineers is constructing. The District is contributing a significant portion of the project cost; managing all real estate transactions for right-of-way land acquisition and easements; and will own and operate the project after it is constructed. Although the Corps previously screened alternatives in the *General Reauthorization Report/Environmental Impact Statement* (GRR/EIS) (March 2014), the District must also analyze alternatives pursuant to CEQA. The Corps-selected project design includes (but is not limited to) a

roughly 1,300 foot long, 1.5 foot high floodwall. The District's preferred alternative is the same as the Corps' but with modifications which increase the length of the floodwall to about 2,200 feet, and the height by up to 0.5 feet. The added length and height would bring Alternative 2A to meet the Federal Emergency Management Administration's (FEMA) standards. As described further below, we provide the following comments on the DEIR, including, but not limited to:

- The DEIR alternatives analysis is limited to that of the Corps' GRR/EIS, so does not meet CEQA requirements to include a full array of feasible alternatives.

- Inconsistencies related to sediment and vegetation maintenance activities and mitigations.

- The Project preferred alternative would not comply with the *San Francisco Bay Water Quality Control Plan* (Basin Plan) requirement that impacts to wetlands and other waters of the State be avoided and minimized to the extent practicable.

- Mitigation for impacts on waters of the U.S. and waters of the State does not comply with the State and Regional Water Board policies.

COMMENTS

1) **Pre-selected Alternative.** The District only analyzed alternatives that were previously screened by the Corps for the Corp' Final GRR/EIS (March 2014). Therefore, the DEIR's alternatives analysis does not constitute a full array of feasible alternatives, so does not fully meet the CEQA requirements. This is particularly relevant because the Water Board cannot permit or certify the Project unless we concur with the lead agency's CEQA determination. As currently proposed, the Project does not meet the Water Board's policies, nor does it adequately meet CEQA requirements for reasons discussed in the following comments.

2) **Sediment Transport.** The Project will result in a wider and deeper channel than the existing channel morphology, but the DEIR does not explain how sediment will be transported through the Project reach. Without explaining sediment transport in the Project, the DEIR does not adequately describe the potential post-Project impacts or mitigations necessary to address impacts for sediment removal maintenance activities. The DEIR, section 3.1 (last paragraph) states:

    Because the proposed project is being designed to result in less erosion due to lower flow velocities, more stable bank design, and enhanced flow conveyance through bridges and culvert openings, operations and SMP2 maintenance actions associated with sediment removal and repair of eroded banks or access roads are likely to be reduced in magnitude compared to existing channel operations and maintenance activities.

This statement is unfounded because the DEIR does not include data about existing sediment maintenance and how the Project will cause less sediment maintenance needs. In addition, without a sediment transport analysis, there is no evidence to show that the source of sediment is from eroding banks within the Project reach.

Water Board staff's best professional judgment regarding sediment transport in the Project reach is that the existing channel expresses a sustainable shape throughout the system, and the Project documents do not support that the proposed channel design is sustainable (Attachment A1 through A3). For example, the channel models could not identify depositional areas due to the ongoing maintenance to remove sediment (Attachment A-3: GRR/EIS, Appendix B, Part III-*Geomorpologic and Sediment Transport Assessment*, pg. 2-17). The existing channel width is consistently about 10 to 12 feet, including areas upstream and downstream of the Project reach as Water Board staff observed on September 4, 2015 and as shown in the Corps' draft 60 percent 60 percent design plans (June 2015). The sediment processes in the Project reach will result in sediment accumulation and eventually the same channel dimensions as existing conditions. This could adversely impact flow conveyance, which would not be consistent with the Project objectives.

Based on these findings, the Project will require ongoing, repetitive maintenance for sediment removal, which will result in repetitive impacts on the creek habitat which the DEIR does not disclose. Although the DEIR states that the District plans to conduct sediment maintenance to maintain conveyance (sections ES-5, 3.5.2.1), the maintenance needs may exceed the District's Stream Maintenance Program ("SMP2") thresholds, but this is not addressed in the DEIR. Please revise the DEIR to adequately explain the sediment transport processes in the Project, and the associated impacts due to future sediment maintenance activities and mitigations for the impacts.

3) **Project Objectives.** The DEIR lists the following three objectives for the Project (section 2.3.5):

- *Objective 1:* Reduce flood damages from Berryessa Creek upstream of Calaveras Boulevard throughout the study reach during the 50-year period of analysis beginning in 2017. Completed project would meet FEMA certification standards in all 4 project reaches.
- *Objective 2:* Use environmentally sustainable design practices in addressing the flood risk management purpose of the project wherever possible within the study reach, including taking advantage of restoration opportunities that may be pursued incidentally to the flood damage reduction purpose.

- *Objective 3:* Be consistent with Berryessa Creek Flood Risk Management Project Plan selected by USACE in the Director's Report of May 29, 2014.

Regarding Objective 2, the DEIR does not define "environmentally sustainable design practices." Please revise the DEIR to include the District's definition for this and to specify how the proposed Project meets this objective. Given Water Board staff's concerns regarding sediment transport in the Project (see Comment 2), the ongoing maintenance we anticipate will be necessary would not be consistent with an environmentally sustainable design.

Regarding Objective 3, the DEIR is not entirely consistent with the GRR/EIS because it does not include the GRR/EIS objective to "reduce sedimentation and maintenance requirements" (GRR/EIS, section 1.1). Please revise the DEIR to reconcile this discrepancy in consistency with the GRR/EIS.

4) **Impacts on Biological Resources.** The DEIR, section 2.5.5 states that the District plans to operate the Project under the District's existing Stream Maintenance Program (SMP2) for sediment removal tasks to maintain flow conveyance capacity and vegetation removal to maintain access and for fire prevention.

However, this contradicts the District's statement that the existing open water/aquatic vegetation (1.25 acres) and transitional vegetation ranging from the active channel to the channel uplands (up to about 3.27 acres) that will be removed for the Project would recolonize and thus serve to mitigate for what the District is calling a temporary impact that is less than significant with mitigation. The following excerpt is the District's rationale for this finding (section 3.5.5.1):

> *It is anticipated that wetland and transitional vegetation would regenerate naturally over the course of the first two growing seasons, and since the bottom width of the stream channel would be wider than under existing conditions, additional areas of wetland plant communities are likely to form. Because wetland vegetation would regrow after construction is complete and the area of wetlands vegetation would increase when compared to the existing condition, this impact would be less than significant.*

Water Board staff does not agree that the impacts would be less than significant, given that the DEIR contains no plans or evidence to support that the same or comparable hydrophytic vegetation would colonize naturally and meet or surpass the functions and values of the existing vegetation. In addition, the District plans to remove sediment and vegetation (section 2.5.5), so the assumption that the impacted vegetation would recolonize is unfounded.

Please revise the DEIR to include appropriate mitigation to compensate for both

temporal and spatial losses in functions and values of the open water/aquatic vegetation and transitional vegetation. Such a plan would need to include, at least at the conceptual level, the types, numbers, densities, and locations of vegetation plantings, and success criteria. The details would need to be further developed in a mitigation and monitoring plan. We note that while the DEIR includes plans to hydroseed the banks to promote bank stabilization, particularly after coconut-fiber blanket biodegrade (3+ years), the DEIR does not discuss the nature of hydroseed (e.g., the species make-up), monitoring plans, or other details to demonstrate appropriate level of compensation for impacts on open water/aquatic and transition vegetation.

5) **Impacts on Beneficial Uses.** The DEIR repeatedly states or implies that the existing habitat is of marginal quality (e.g., sections 3.5.2.1, 3.5.2.3, and Table 3.12) and uses this as a basis for maintaining the status quo or even reducing the Project reach's beneficial uses. Water Board staff observed flowing and ponded water and egrets and mallard ducks in multiple sites along Reaches 1-3 during a site visit on September 4, 2015, despite the inspection occurring in the end of the dry season in the midst of a severe drought. These observations are consistent with the REC-2 (non-contact recreation such as bird-watching) and WILD (wildlife habitat) beneficial uses of the Project reach designated by the Water Board and listed in the Basin Plan, Table 2.1. The other beneficial uses are for body-contact recreation (REC-1); and warm water aquatic habitat (WARM). Because the Project would impact aquatic and transitional vegetation, the habitat the vegetation supports would be impacted. However, the DEIR does not address this. Please revise the DEIR to recognize the Project reach's designated beneficial uses and a plan to appropriately mitigate any unavoidable impacts on the creek habitat, especially the REC-2 and WILD beneficial uses.

6) **Description of Impacts on Creek Hydrology.** The District's alternatives analysis does not adequately address the potential of exposing the water table in new areas and resultant alterations in the creek's hydrology. Consequently, the DEIR does not include any mitigation for this potential impact on the post-Project hydrology. The Project would excavate to variable depths of 9 to 20 feet (Table 5.4). Given that the depth to groundwater ranges from about 7 to 20 feet below grade (DEIR, Appendix D-Geotechnical Report), the post-Project conditions would likely result in more area of the channel invert being in the groundwater table than existing conditions. Please revise the DEIR to address the post-Project hydrology conditions, and the impacts from vegetation and sediment maintenance activities on the creek's functions, values, and beneficial uses.

7) **Bank stabilization**
   A. **Discrepancies in DEIR and Appendix D.** The DEIR main body discusses that biodegradable coconut mats will be used for erosion control and bank stabilization (sections ES4, 2.5, and others). However, Appendix D-

Geotechnical Report (April 2015), section 2.1 states: “The erosion protection will consist of rip rap on the lower portion of the slope and geocells filled with aggregate or concrete on the upper portion of the slope,” and this is reiterated in section 23. In addition, Appendix D, section 12 states: “Rip rap is also being used for the channel invert between approximately Stations 115+00 and 164+00.” Please revise the DEIR to reference any inaccuracies and inconsistencies in the Geotechnical Report (or any other appendices, as appropriate). Please note that the Water Board staff has communicated to the Corps-District design team that the use of geocell bank stabilization does not comply with Water Board policies or the requirements in the Basin Plan to avoid and minimize impacts to the extent practicable.

B. **Hydroseed**. The DEIR states: “Channel banks would be protected with biodegradable erosion control blankets and hydroseeded” (ES-4; Table ES-2; section 2.5.2; and others). We caution that erosion control treatments such as hydroseeding, hydraulic mulch, tackifiers, soil binders, and straw mulch could wash into the channel rendering the erosion prevention method ineffective. Other soil bioengineering methods such as the planting of willow stakes and emergent in-stream vegetation could be used to stabilize the bed and banks below the mean high water level. Has the District considered integrating willow stakes or other bioengineering methods in the Project for bank stabilization?

8) **Alternatives Analysis for the 401 Certification**. Please note that for the Water Board to permit the proposed Project pursuant to the Clean Water Act, section 401, we require a project proponent to conduct an alternatives analysis consistent with the U.S. Environmental Protection Agency’s 404(b)(1) Guidelines. The Basin Plan incorporates the 404(b)(1) Guidelines by reference to determine the circumstances under which filling of wetlands, streams or other waters of the U.S. and/or the State, as the District proposes with this Project, may be permitted. In accordance with the Basin Plan, filling, dredging, excavating and discharging into a wetland or water of the state is prohibited unless the project meets the least environmentally damaging practicable alternative (LEDPA) standard as determined through the 404(b)(1) alternatives analysis. Although the LEDPA analysis is not required by CEQA, a project proponent may tailor their alternative analysis to fulfill both the CEQA and 404(b)(1) requirements to help expedite the Water Board’s Project review to issue a 401 Certification.

For example, during pre-CEQA interagency meetings, Water Board staff made suggestions that would help the Project meet the LEDPA standard by minimizing impacts in the creek and maximizing its beneficial uses (Interagency meetings, August 4 and August 11, 2015). This input includes: (1) planting willow stakes in the streambed edges; (2) installing the proposed pre-cast concrete culverts at grades that allow the formation of earthen bottoms; (3) using bioengineering

methods in place of concrete for bank armoring and/or some or all floodwalls; and (4) identifying opportunities to maximize both flood conveyance capacity and opportunities for future adaptive management of the channel by increasing channel cross section. For example, such adaptive management practices could be completed where the Corps' preferred alternatives propose reaches with maintenance access roads on both sides of the channel, by removing or lowering the road on the non-multi-purpose path side.

The District did not incorporate the Water Board staff's suggestions in the CEQA analysis, except for DEIR Alternative 4. At three times the cost of the District-preferred alternative, Alternative 4 is cost-prohibitive because it apparently incorporates the "all options" scenario (though this is not explicitly explained in the DEIR). Water Board staff recommends the District revise the CEQA alternatives analysis to include feasible alternatives to meet the LEDPA standard. This would help expedite Water Board staff's Project review for the 401 Certification process.

In summary, Water Board staff appreciates the opportunity to provide comments on the DEIR. The DEIR is well-organized, but it does not adequately describe the proposed Project's environmental impacts and associated mitigations. In addition, the proposed Project would not meet the Water Board's requirements for project proponents to avoid and minimize impacts and to appropriately compensate for any unavoidable impacts in accordance with the Basin Plan and (404(b)(1) Guidelines. If you have any questions about our comments, please contact Susan Glendening of my staff at (510) 622-2462 or via email to Susan.Glendening@waterboards.ca.gov.

Sincerely,

William B. Hurley
Senior Engineer

Attachments:

A-1: Section 6.2 excerpt from the *GRR/EIS,* March 2014

A-2: Pages iii, and A-4 through A-6 from the *Final Independent Peer Review Report, Berryessa Creek*, March 6, 2013

A-3: GRR/EIS, Appendix B, Part III-*Geomorphologic and Sediment Transport Assessment,* March 2012

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Attachment A-1

GRR/EIS, Section 6.2

General Reauthorization Report/Environmental Impact Statement

Prepared by U.S. Army Corps of Engineers, Sacramento

March 2014

FINAL EIS 2015

6.2 COMPARISON OF ALTERNATIVE PLANS

The purpose of this step is to compare the results from the evaluations completed, for the purpose of developing a recommended plan that addresses the flooding problems in Berryessa Creek. A more detailed project footprint, including temporary construction easements, staging areas, and access routes, is presented in the overview exhibits at the end of Chapter 6.

6.2.1 Hydraulic Design

6.2.1.1 Hydrologic Effects

With-project discharges are actually higher within the creek than the without-project discharges. This is typical of flood risk management projects that maintain flow within the channel that otherwise would overflow onto the floodplain in the without-project condition. The discharges for the without- and with-project conditions upstream of I-680 remain the same in Alternatives 2A/d and 4. On the other hand, the difference between without- and with-project discharges upstream of I-680 is less pronounced in Alternative 5.

6.2.1.2 Water Surface Profiles

The with-project water surface elevations resulting from the additional discharge in Alternatives 2B/d, 4/d, and 5 are generally higher than in Alternative 2A/d, but the amount of increase is highly variable. These results are for fully contained flows. Comparison to existing conditions is therefore hypothetical only; the computed without-project (Alternative 1) water surface elevation at any point assumes full containment at each upstream section, and flows are restricted to the extent of each cross section in the event of breakout.

Among different alternatives, the different channel configurations downstream of I-680 affect water surfaces that vary by reach. The vegetated terraces in Alternative 4/d tend to reduce the available conveyance in the channel in comparison to Alternatives 2A/d and 2B/d.

6.2.2 Sediment Transport

The quantitative sediment analysis was conducted for the without-project, Alternatives 2A/d, 2B/d, and 4/d using hydraulic models developed for previous phases of this study for existing conditions between Old Piedmont Road and I-680. In addition, analyses were conducted for Alternatives 2B/d and 4/d assuming the proposed SCVWD bypass alternative was in place between Old Piedmont Road and I-680.

The analysis indicated an increase in sediment transport through the I-680 to Montague Expressway and Montague to Calaveras Boulevard for Alternatives 2A/d and 2B/d. The increased transport results in a decrease in deposition in the I-680 to Montague reach for the alternatives. With a larger amount of sediment being transported through the upstream reach, there is an increase in the amount of deposition in the Montague to Calaveras Boulevard reach for all alternatives over the without-project alternative. Overall, the total amount of sediment deposited in the study area for Alternatives 2A/d and 2B/d is nearly equal to that under the

upstream

without-project conditions. In contrast, the analysis showed a marked increase in deposition in for Alternative 4/d.

The analysis also showed a significant reduction in the deposition in the sediment basin below the Piedmont-Cropley culvert over existing conditions. This is due to a majority of flood flows being transported through the proposed SCVWD bypass culvert. The reduction in the flood flows to the Greenbelt reach results in a significant reduction in the sediment supply to the downstream reach. The sediment supply conveyed through the bypass culvert adds to the supply to the downstream reach, but accounts for only a small portion of the reduced Greenbelt sediment supply. The sediment transport rate for the Morrill to I-680 reach is greater than the combined sediment supply for the Greenbelt and bypass culvert. Since the sediment transport capacity through the reach is greater than the incoming supply, no deposition is seen in the reach. For Alternatives 2B/d and 4/d, there is an increase in sediment transport through the I-680 to Montague and Montague to Calaveras reaches over the without-project alternative. The increased transport results in no deposition in the I-680 to Montague reach. Normally, a larger amount of sediment being transported through the upstream reach would result in an increase in the amount of deposition in the Montague to Calaveras Boulevard reach. But since the supply from the Greenbelt reach is limited, the transport capacity of Alternative 2B/d can transport the entire supply to the downstream reach with no deposition and Alternative 4/d showing a small amount of deposition.

Throughout the study area, there are large variations in velocities and shear stresses that can cause localized sedimentation and scour problems. During the design phase, the project design needs to be further refined to reduce the level of these changes. Additionally, the measures used to provide passage of the design event through bridges should be reviewed. There may be the creation of significant backwater conditions in cases in which walls were extended above the bridge deck to contain flows. The reduced velocity and shear stress may cause an additional potential for additional, localized deposition in an area that in some cases already experiences deposition.

Currently, the study area is a deposition zone, and a reduction in velocity will further increase deposition and the need for maintenance. Constructed features should facilitate removal of deposited sediments.

6.2.3 Floodplains

The final array of alternative plans was analyzed using the Lower Berryessa Creek FLO-2D model. Of the four project alternatives, only Alternatives 2A/d and 5 have breakouts from the Berryessa Creek channel for the modeled events. Alternatives 2B/d and 4/d were developed to meet FEMA certification requirements using risk-based principles assuming SCVWD's bypass structure upstream of I-680 is implemented. The bypass design resulted in higher flow rates at I-680 resulting in Alternatives 2B/d and 4/d to have a larger conveyance capacity allowing both alternatives to convey up to the 0.002 exceedance probability event. Thus, no residual floodplains were mapped for these alternatives.

Attachment A-2

Pages iii; A-4, A-5, and A-6

Final Independent External Peer Review Report
Berryessa Creek, Santa Clara County, California,
General Reevaluation Study (GRS)

March 6, 2013

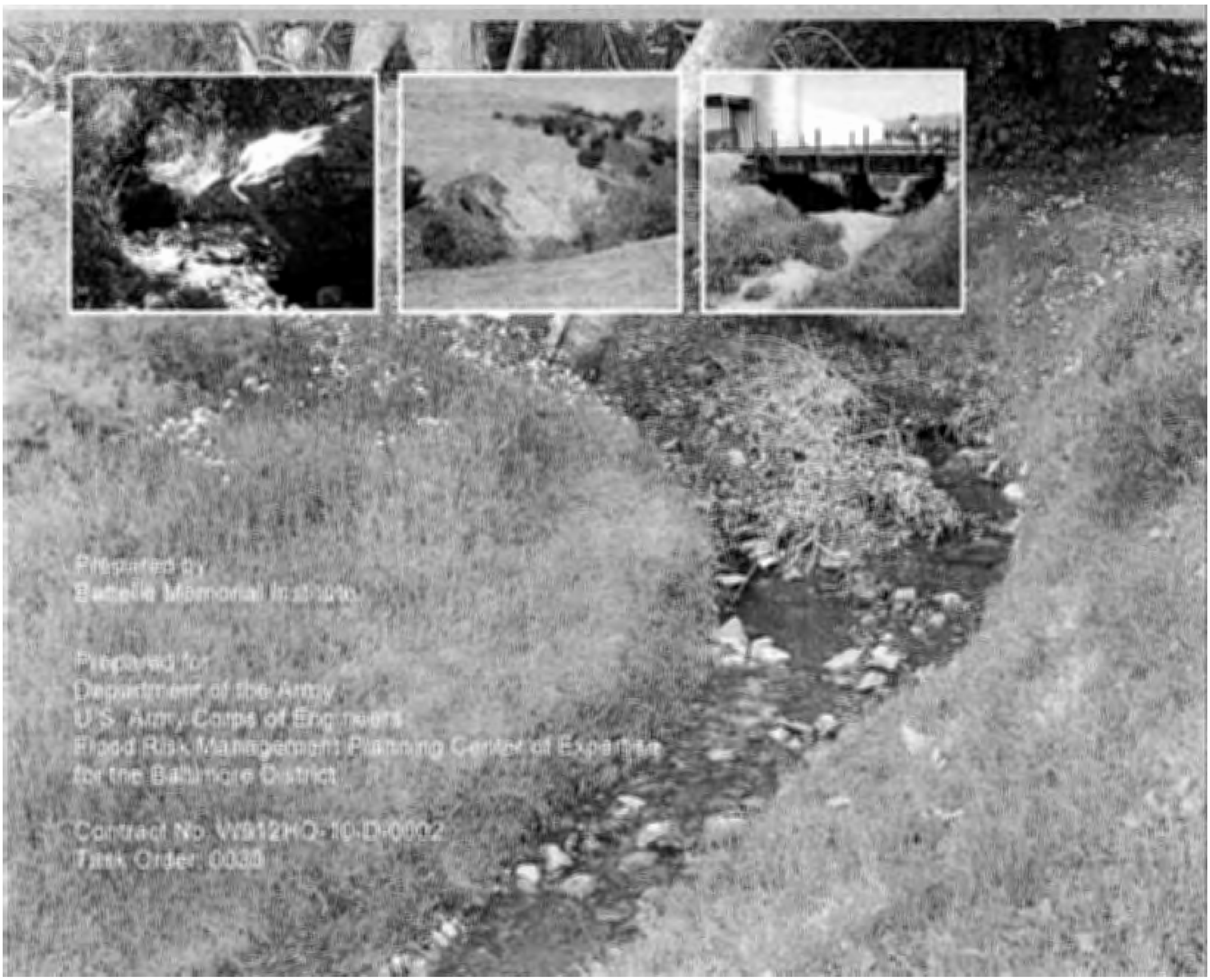
Prepared by Battelle Memorial Institute

Prepared for Department of the Army
U.S. Army Corps of Engineers
Flood Risk Management Planning Center of Expertise for the Baltimore District
Contract No. W912HQ-10-D-0002
Task Order: 0030

Battelle
The Business of Innovation

March 6, 2013

Final Independent External Peer Review Report Berryessa Creek, Santa Clara County, California, General Reevaluation Study (GRS) Draft General Reevaluation Report and Environmental Impact Statement/Environmental Impact Report



these, six were identified as having high significance, eight had medium significance, and one had low significance.

Results of the Independent External Peer Review

The panel members agreed among one another on their "assessment of the adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used" (USACE, 2012; p. D-4) in the Berryessa Creek review documents. The Panel found that, overall, the Berryessa Creek report is well organized and comprehensive. An extensive array of engineering measures was considered in the development of alternatives and the criteria to eliminate plans from future study are well described and logical although the impact of sedimentation on the channel design has not been considered adequately. Table ES-1 lists the Final Panel Comment statements by level of significance. The full text of the Final Panel Comments is presented in Appendix A of this report. The following statements summarize the Panel's findings.

Engineering – The Berryessa Creek GRS/Draft GRR/EIS/EIR contains extensive details on the hydrologic and hydraulic analyses performed. In general, the assumptions that underlie the engineering aspects are technically sound and appropriate. The hydrologic and hydraulic modeling procedures as presented in the report are technically sound and acceptable. Although the report presents overwhelming evidence of sedimentation issues within the project area, neither the impact of sedimentation issues on the channel design nor details on the maintenance activities with relation to sedimentation have been presented. In addition, there are insufficient details on the maintenance activities with relation to sedimentation. The Panel has expressed significant concern about the lack of details on the operation and maintenance (O&M) plan and has identified the need for a detailed O&M plan to ensure the design assumptions concerning sedimentation are valid.

Economics – The Panel determined that the adequacy and acceptability of the structure and content values, total annual costs, and the results of the economic risk analysis could not be determined due to lack of documentation. The report does not describe the methods used to develop the structure inventory, conduct and verify the content survey, and calculate structure values. The Panel was unable to determine if the structure and content data used in the analysis are accurate and if they reflect the current conditions in the study area. Several issues pertaining to the calculation of annual equivalent damages (AED) to structure and content, the unexplained increase in benefits resulting from the incorporation of risk and uncertainty, and the presentation of the results of the economic analysis are identified that could significantly impact the findings of the economic analysis. In addition, the report contains little documentation describing the development of the lands, easements, rights-of-way, relocations, and disposal areas (LERRD) costs and the annual operation, maintenance, repair, replacement, and rehabilitation (OMRR&R) costs, preventing an accurate assessment of the total annual costs used in estimating the benefit to cost ratios. Based on the analysis presented in the reviewed documents, the Panel cannot accurately assess the economic feasibility of the Recommended Plan.

Environmental – The Berryessa Creek GRS/Draft GRR/EIS/EIR adequately describes existing conditions of vegetation in the project area, but does not include a thorough review of special-

Final Panel Comment 1

The impact of sedimentation is not included in the hydraulic modeling aspect of channel design.

Basis for Comment:

The Main Report and Appendices provide overwhelming evidence of active sediment transport throughout the project reach as explained below:

- Appendix B, Part III, Section 2.2.1 describes the presence of a high sediment production zone in the upper watershed with erosive soils/landslides and steep channels capable of transporting the large quantities of sediment to the downstream watershed.
- Appendix B, Part III, Section 2.2.1.4 (p. 2-17) states that HEC-6T sediment modeling results indicate "a mixture of aggradation and degradation scattered throughout the project area."
- Main Report, Section 2.2.1.1 presents the results of sediment yield analysis showing estimated sediment delivery as:
  1. Berryessa Creek at Old Piedmont Road = 9,900 tons/year
  2. Sweigert, Crosley, and Sierra Creeks = 1,900 tons/year
  3. Piedmont Creek = 700 tons/year
  4. Arroyo de los Coches = 3,200 tons/year.
- Appendix B, Part III, Section 2.2.2 presents the sediment removal history based on Santa Clara Valley Water District (SCVWD) maintenance records. These records show sediment removal occurring throughout the project area.
- Appendix B, Part III, Section 2.2.2 (p. 2-21) describes the possibility of sediment being transported through the project area to the reach downstream of Calaveras Boulevard.
- Main Report, Section 2.4.1 states, "Winter flows tend to be turbid, due to sediment loading from the surrounding foothills and from bank erosion along the creek."
- Appendix B, Part I, Section 5.3.2 states, "Based on the observations of David Adams of the SCVWD, sediment removed in the maintenance reaches upstream of Calaveras Boulevard is approximately uniformly distributed within each channel reach (rather than concentrated at bridge locations)."

Although there is overwhelming evidence that sedimentation occurs throughout the project reach, according to Main Report, Section 4.4.2.6, "For the hydraulic analysis, it was assumed that the channel is in its maintained state with the sedimentation basin downstream of Piedmont-Cropley cleaned out and the invert of bridges the same as those in the USACE model."

The hydraulic modeling performed in the study assumed clear channel conditions and did not analyze the potential reduction in channel capacity due to sediment deposition in the channel bed. In addition, high sediment concentrations can create "bulking" (Mussetter et al., 1994) of the flows, where the sediment volume becomes significant compared to water volume so that higher water surface elevations may result due to the presence of suspended sediment load. The impact due to "bulking" of flows is not considered as part of the hydraulic (HEC-RAS and FLO-2D) modeling. The design discharges were not adjusted to accommodate "bulking" of the flows due to sediment load.

Significance – High:

Reduction in channel capacity due to sediment deposition and bulking can impact the flow containment and extent of flooding, which will affect the project objective of reducing flood damages and the level of risk reduction achieved can be less than the project objective of 90-95 assurance for the 1-percent flood event.

Recommendations for Resolution:

1. Investigate post-sedimentation within the channels using post-sedimentation cross-sections from the sediment transport model.
2. Adjust design discharges to accommodate bulking of the flows due to sediment load.

Literature Cited:

Mussetter, R. A., P.F. Lagasse and M. D. Harvey (1994). Sediment Erosion and Design Guide. Prepared for the Albuquerque Metropolitan Arroyo Flood Control Authority by Resource Consultants and Engineers, Inc., Fort Collins, CO.

Final Panel Comment 2

The operations and maintenance plan does not present sufficient details related to sediment removal and maintenance of clear channel conditions.

Basis for Comment:

Sediment management is key to the success of the project as the project design is developed on the assumption of clear channel conditions. It is critical to ensure that the operations and maintenance (O&M) plan contains adequate details describing the process that will be adopted to maintain the channel through sediment removal. However, the O&M plan as presented in the Main Report Section 7.4 consists of only a single paragraph and does not provide sufficient details on the sediment removal process, sediment removal locations, or sediment removal frequency.

There are other sections of the Main Report that discuss the need for sediment removal through maintenance:

- Main Report (p. 2-17) describes the significant blockage of the Cropley and Piedmont Culvert.
- Both the Authorized Plan and the National Economic Development (NED) Plan identified removal of sediment at the downstream face of I-680 as a project task.
- Appendix B, Part III, Section 3.1.1 describes the need for sediment removal maintenance to preserve adequate flood conveyance capacity.
- Appendix B, Part III, Section 3.1.4 describes the need for identifying and creating designated locations for sedimentation-related maintenance activities.
- Appendix B, Part III, 3.1.5.2 describes the need to maintain vegetation growth within the channels so that sediment can effectively be conveyed by the channel.

In addition, the hydraulic analysis presented in Main Report, Section 4.4.2.6 assumes clear channel conditions without sediment depositions in the channel bed. The Authorized Plan had identified a primary sediment basin near Old Piedmont. In comparison, the NED Plan does not include any improvements upstream of I-680 and therefore does not include a sediment basin to capture the sediment from the upper watershed. As a result, sediment deposition can occur at various locations within the project study area. This section of the report, as well as the Section 7.4 on operations and maintenance, does not clearly describe how the sediment maintenance will be performed or identify all the locations where sediment removal will be performed.

One of the statements presented in Appendix B, Part III explains that existing deposition trends will be exacerbated due to design modifications. The with-project conditions are expected to worsen the sediment deposition, so additional maintenance efforts may be required to counter the increased sedimentation. No details on additional maintenance requirements are presented in this appendix.

Appendix B, Part III (p. 2-21) discusses the possibility of increased deposition in the reach below Calaveras Boulevard. The main report does not present any discussion on downstream impacts and mitigation needed to reduce the amount of sediment carried to downstream reaches outside the project study area.

Attachment A-3

Appendix B, Part III: Geomorphologic and Sediment Transport Assessment

General Reauthorization Report and Environmental Impact Statement

Berryessa Creek Element

Coyote and Berryessa Creeks, California

Flood Control Project

Santa Clara County, California

March 2012

Berryessa Creek Element
Coyote and Berryessa Creeks
Flood Control Project
Santa Clara County, California

Appendix B: Engineering and Design

Part III

Geomorphologic and Sediment Transport Assessment

BERRYESSA CREEK PROJECT

APPENDIX B, Part III: Geomorphic and Sediment Transport Assessment

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CHAPTER 1: INTRODUCTION

This appendix is Part III of the engineering appendices supporting the Berryessa Creek Flood Control Project Post-Authorization Study. The engineering appendices are as follows:

- Part I. Hydraulic Analysis of Alternatives
- Part II. Floodplain Development
- Part III. Geomorphic and Sediment Transport Assessment
- Part IV. Design and Cost of Alternatives

This appendix refers to figures, tables, and results in the accompanying appendices and in the main body of the report. This appendix provides supporting fluvial geomorphology and sediment transport analyses for the formulation and evaluation of the Berryessa Creek Project Alternatives. A summary and interpretation of previous work related to the geomorphology of the system is also included. In addition, insight from observations by the project team is provided, particularly in reference to supply of sediment from the upstream watershed.

Sediment transport analyses of the existing condition are summarized in light of available sediment removal records. The results of the hydraulic analysis of the alternatives is utilized to qualitatively address potential changes in sediment transport conditions under project scenarios compared to the without-project condition. This information is utilized to provide recommendations on design refinements to address fluvial geomorphic and sediment transport aspects of the project design as well as recommendations for additional analyses to support the design effort.

Figure 1-1 shows the delineations of watersheds draining to the project area, as presented in the NHC hydrology report (2003). Figure 1-2 shows the project footprint relative to the road crossings and other features within the project area.

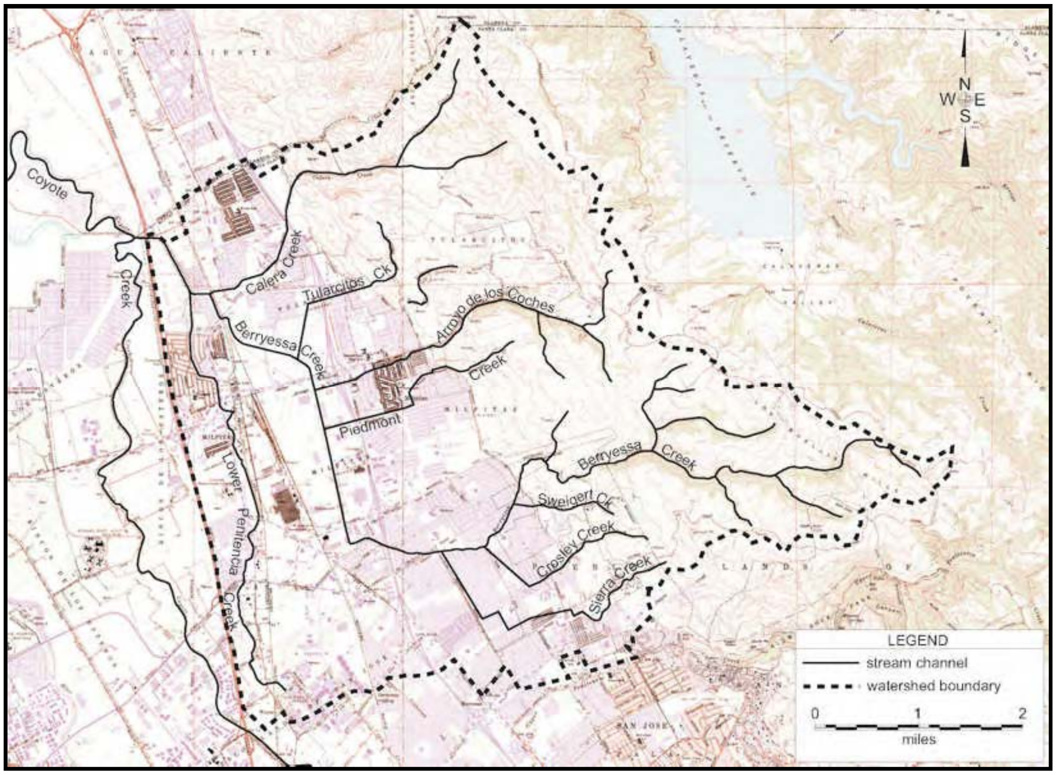

Figure 1-1 Watershed Map (Source: NHC 2003)

Figure 1-2 Project Footprint

A number of issues were identified as important for this analysis to address. An evaluation of the stability of the alternatives in terms of their sediment transport response is necessary. Because of the urbanized nature of the area and the limited area available for the project, it was determined early in the plan formulation process that the channel would be protected in most areas to prevent erosion. However, the channel bed will remain mobile so it is necessary to assess the potential for channel bed aggradation and degradation. The project alternatives should be designed to prevent excessive scour or deposition. The influence of the proposed alternatives on sediment removal requirements is another important issue. Historically, sediment removal in the project area (see Table 2-1) has averaged on the order of 1,046 cubic yards per year upstream and 616 cubic yards per year downstream of I-680 for the project reach with a total of 7,179 cubic yards per year from the entire Berryessa Creek channel. Also tied to sediment removal is the potential for changes to the existing sediment retention basin and construction of additional sediment management structures under consideration by others. The Corps GDM (USACE 1993) included a sediment basin above Old Piedmont Road. To address issues surrounding the reconfiguration of the sediment basin, the watershed was evaluated to determine if there were areas further upstream in which sediment management activities could be applied to reduce sediment delivery to the basin area.

Besides the sediment transport aspects of the design, fluvial geomorphology concepts were applied to evaluate the design and provide recommendations for potential refinements as necessary. Though the project is located in a highly urban environment with limited right of way and numerous constraints created by bridges, roads, utilities, and buildings; the concepts of fluvial geomorphology are still useful in developing an appropriate design. These concepts can help in evaluating the system response to the alternatives and provide input on ways of developing a more sustainable project in terms of maintenance and environmental quality. Application of fluvial geomorphology assisted in the evaluation of the sediment transport issues identified in the previous paragraph. In addition, recommendations for sizing the channel and evaluation of the response of the Greenbelt Reach, which will not be as constrained as the project area, are addressed.

The with-project alternatives evaluated in the current effort were carried forward from the conceptual alternatives presented in the F3 report (Tetra Tech 2004) and subsequently narrowed down to three alternatives by the Corps. Typical cross sections of each alternative are presented in *Appendix B, Part IV: Design and Cost of Alternatives* in this engineering appendix. An important purpose of these alternatives was to evaluate large-scale economic issues between general approaches to flood control. Alternative 1 is the without-project condition. Project alternatives under consideration by others include floodwall construction and excavation of a floodplain terrace within the Greenbelt Reach upstream of I-680 along with a high-flow bypass culvert running beneath Cropley Road. Downstream of I-680, Alternatives 2A/d and 2B/d were formulated to provide flood control utilizing channel excavation and bridge modifications to increase conveyance in a project footprint that could be constructed within the existing right of way. As a result, a large main channel is excavated that has the capacity to convey the 1% chance exceedance event. Alternative 2A/d is designed to pass the 1% chance exceedance event with a 50% conditional non-exceedance probability (CNP) using risk and uncertainty principles with Alternative 2B/d passing the 1%

chance exceedance event with 90% CNP (meeting the FEMA certification criteria). Levees or floodwalls are extended as needed to maintain a consistent capacity throughout the project with the appropriate certainty. Alternative 4/d incorporates vegetated floodplain benches along the low-flow channel, with concrete floodwalls extended vertically from the outer edges of the floodplain bench. This allows Alternative 4d/ to be constructed within the existing right of way.

Alternatives 2B/d and 4/d include the complete replacement of all bridge and culvert crossings with the exception of the Ames Avenue and Yosemite Drive crossings, which would require shoring/stabilization of existing abutments and construction of transition structures, and the I-680 crossing, which would not be affected. Modifications within channel reaches include excavation and levee/floodwall construction. Levees, floodwalls, and tops of bank are designed according to risk and uncertainty principles. Further details on the flow profiles and modeling methodology are described in *Appendix B, Part I: Hydraulic Analysis of Alternatives* in this engineering appendix. The analyses and recommendations presented in this appendix will be utilized to guide future sediment transport modeling efforts supporting more detailed designs that are carried forward.

CHAPTER 2: EXISTING CONDITIONS

2.1 Summary of Geomorphology

This report generally assesses the impacts of the sediment generated in the upper watershed on the proposed project alternatives in the lower watershed. Two primary documents provide information describing the geomorphology of Berryessa Creek within the project area and the upstream watershed: the Sacramento District's GDM (USACE 1993) and "Upper Berryessa Creek GRR Basin Geomorphology Technical Memorandum" (NHC 2001). "An Urban Geomorphic Assessment of the Berryessa and Upper Penitencia Creek Watersheds in San Jose, California," a Colorado State University dissertation by Jordan (2009), contains data and conclusions applicable to the site geomorphology and will likely be published in the near future. Preliminary results and analysis methods are summarized at the end of this report in Addendum 1. In addition, Tetra Tech has conducted several site visits to the project area and the upstream watershed to observe and document conditions related to fluvial geomorphology. The summary of existing geomorphic conditions is based on these three sources.

2.1.1 Geology and Soils

The Berryessa watershed consists of two distinct landforms. The watershed above the urbanized area is mountainous terrain consisting of the Los Buellis Hills, part of the Diablo Range. The highest point in the watershed is Monument Peak at an elevation 2,594 feet. Within the project area, Berryessa Creek flows across an alluvial fan created by Berryessa Creek and its tributaries. The minimum elevation in the watershed is 3 feet at the confluence with Penitencia Creek. At the downstream limits, Berryessa Creek is tidally influenced. Under existing conditions, the upland portion of the watershed is mostly undeveloped with a few residences scattered mostly along the basin divide. The primary land use in the upland portion of the watershed is grazing. Due to zoning practices, the future condition is not anticipated to change significantly in terms of land use. In contrast the alluvial fan portion of the watershed is almost entirely urbanized.

In the uplands, the geology consists mainly of Tertiary and Quaternary age sedimentary rocks composed primarily of sandstone, siltstone and shale. Minor tuff, claystone and partially to completely serpentinized ultramafic rock outcrop in the basin in smaller amounts (NHC 2001). As shown in Figure 2-1, two major faults cross the lower and upper extents of the watershed. The Hayward Fault zone trends across the base of the Los Buellis Hills and the Calaveras Fault passes along the upper watershed boundary. These two major faults and numerous minor faults cross the Berryessa Creek watershed in northwest to southeast direction.

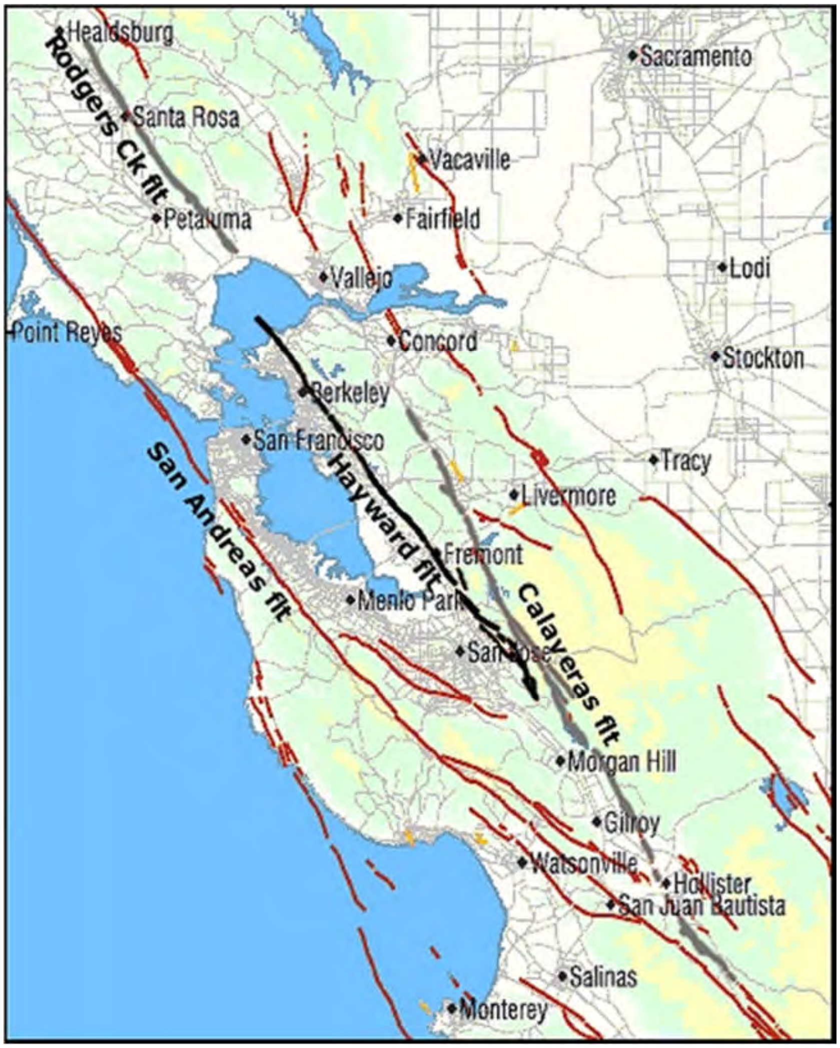

Figure 2-1 Bay Area Fault Zones (Source: USGS)

An important feature of the watershed occurs in the Hayward Fault zone, an area referred to in the previous reports as the "canyon" reach, extending from about 1,000 to 4,000 feet upstream of Old Piedmont Road. Underlying bedrock in this reach is composed of poorly consolidated, highly fractured Tertiary age rocks that contain swelling clays (NHC 2001). This is a high sediment production zone with erosive soils, large sediment supply from landslides, and a steep channel section capable of transporting large quantities of sediment. This is the only reach observed during the Tetra Tech watershed reconnaissance that had evidence of debris flows and transport of large boulders, several feet in diameter and larger. It also contained the only adjacent watershed area that was observed to have numerous active landslides scarps. The GDM (USACE 1993) supports this statement, indicating, "Upstream of the canyon zone, the ravines in Berryessa Creek and its larger tributaries are well treed and appear to be relatively stable."

Soils in the upland portion of Berryessa Creek are said to be of two types: clay loams on the relatively gentle slopes, and coarse rocky or gravelly soils on steeper slopes. Both types are derived from the underlying sedimentary rocks, the clay loams by weathering and vegetation, and the rocky soils by physical disintegration especially in the fault and shear zones (USACE 1993).

The geology of the alluvial fan in the Santa Clara Valley portion of the watershed is limited to Quaternary age, semi-consolidated alluvium near the base of the Los Buellis Hills with younger, unconsolidated alluvium further downslope. The alluvial sediments are largely fine grained, consisting primarily of moderate to poorly sorted fine sand, silt, and clay (NHC 2001). Borehole data from this lower portion of the creek, particularly downstream of I-680 show the creek to be underlain by large amounts of clayey soils.

In general, the Santa Clara Valley is underlain by some 1,000 to 1,500 feet of alternating estuarial and alluvial fan deposits of Quaternary age. The estuarial deposits were laid down under episodes of marine flooding and the alluvial fans during dryland episodes when the sea level was lowered during the major glaciations. The surficial materials in the valley are partly coarse alluvial fan deposits from stream channels, and partly fine materials derived from suspended load deposition during floods in areas between the stream channels (USACE 1993).

Within the project area, the streambanks are formed of fairly erosion-resistant material; the soils contain a large clay component primarily consisting of silty and sandy clay. Upstream of I-680, soils retain a significant clay component but exhibit more frequent clayey silt and clayey sand lenses with occasional gravels (NHC 2001). As a result, eroded sections of streambanks in this area are near vertical. Within the project area, bed material is somewhat variable due to the high level of channel alteration and the presence of numerous bridges and several other hydraulic structures. In general, the bed material is composed of sands and gravels. The average distribution for the entire urbanized reach upstream of Calaveras Boulevard, as presented in NHC (2003), is 28 percent sand, 69 percent gravel and 3 percent cobble with a median diameter of 5.5 mm (fine gravel).

The watershed upstream of Old Piedmont Ave. was broken into reaches with common characteristics based on field observations. Classification of these characteristics by reach allows for explanation of sediment transport-related trends and prediction of future erosion and deposition zones on a qualitative basis. The reach breakdown is shown in Figure 2.2 along with the locations of photographs presented below.

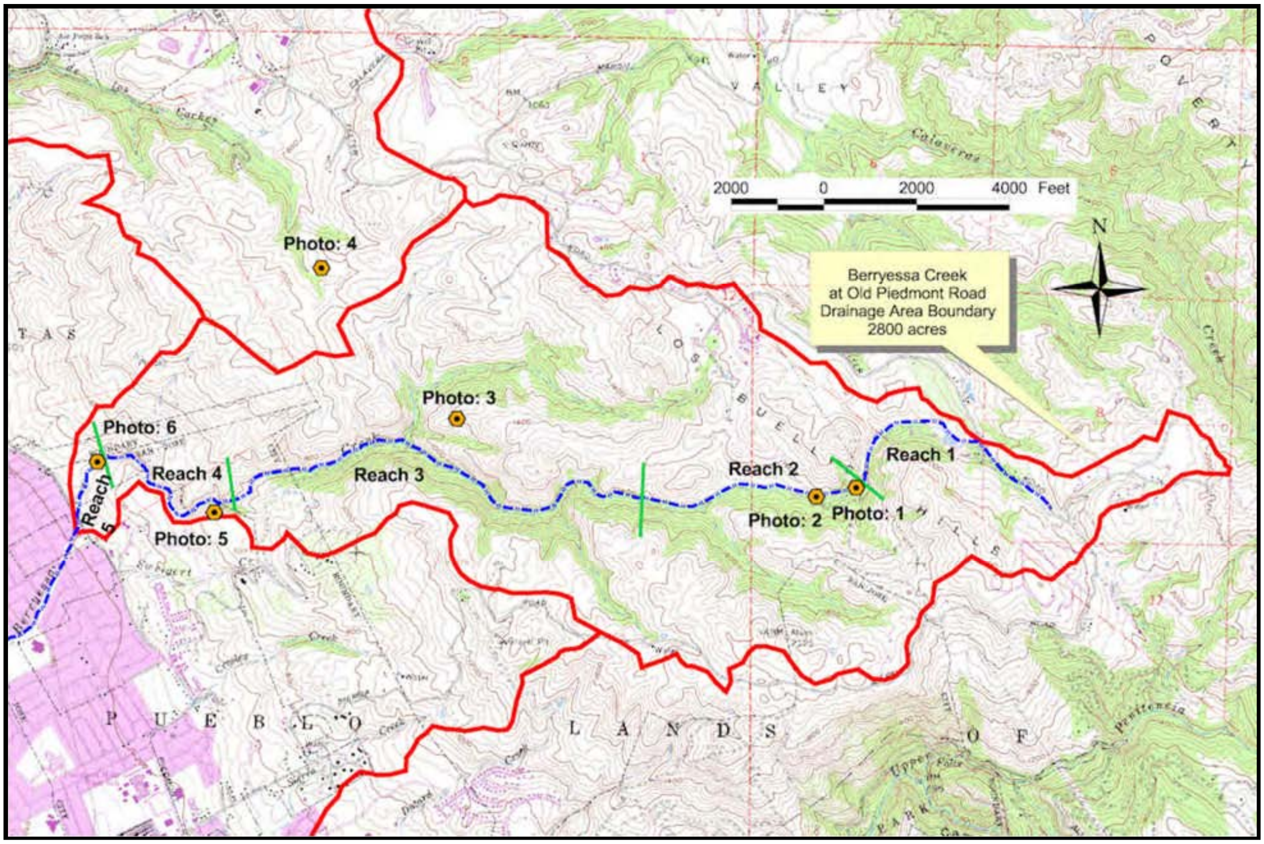

Figure 2-2 Upper Watershed Boundary, Reaches, and Photo Locations

2.1.2 Stream Profile

There is a distinct difference between the profile of Berryessa Creek in the uplands and on the alluvial fan within the Santa Clara Valley. Figure 2-3 shows the profile for the entire length from the estuary downstream from the confluence with Coyote Creek, upstream to the headwaters. Within the valley reach, which includes the project area, the channel gradient averages less than 1 percent. In contrast, the upland reach averages over 6 percent.

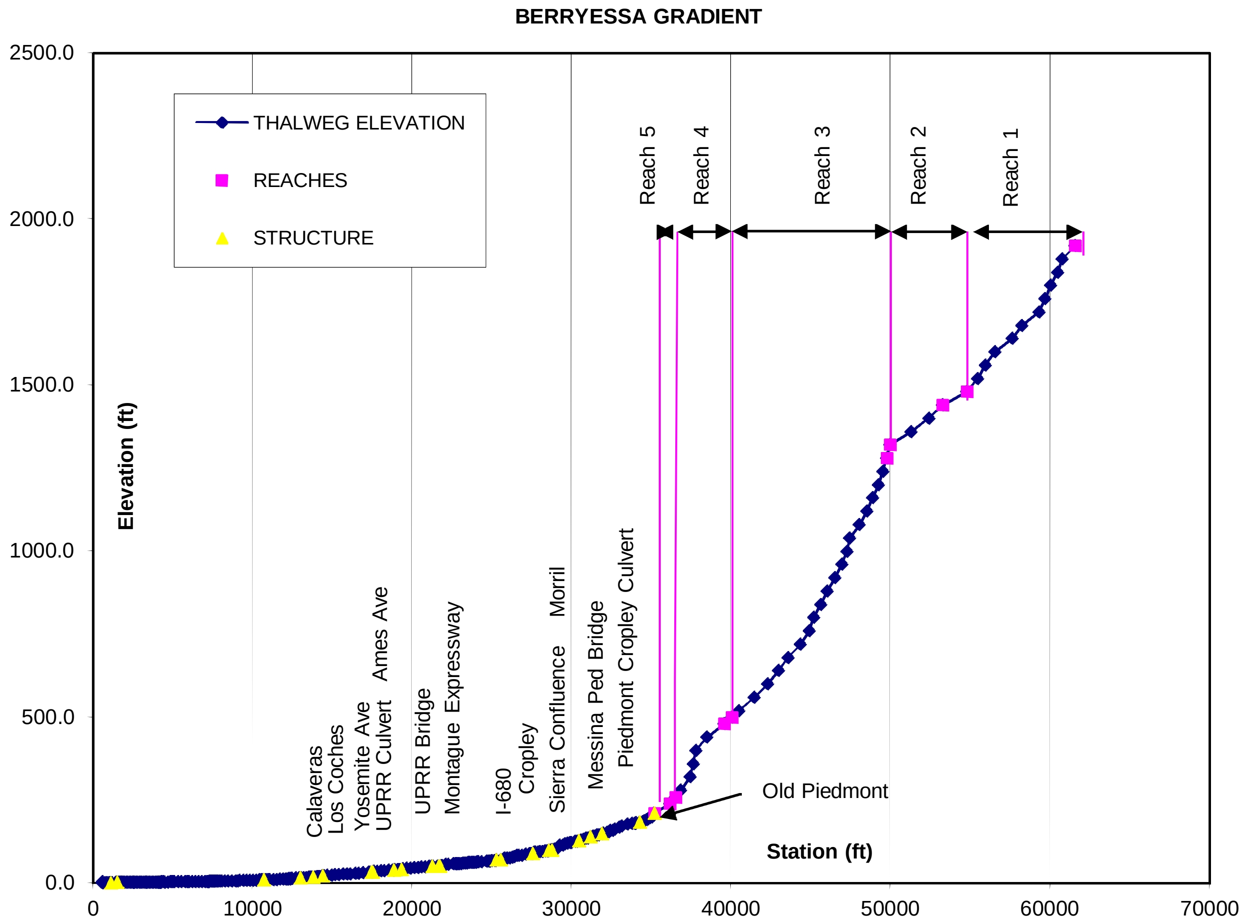

Figure 2-3 Berryessa Creek Profile from the Estuary to the Headwaters

Upstream of Calaveras Boulevard, the gradient follows the expected pattern of downstream reduction, with one exception. Starting at Old Piedmont Road, channel gradients are listed below:

Old Piedmont Road to Cropley Avenue	0.0271
Cropley Avenue to D/S of Piedmont Sediment Basin	0.0180
D/S of Sediment Basin to U/S of Sierra Cr. Drop	0.0156
Drop Structure to Cropley Avenue	0.0135
Cropley Avenue to I-680	0.0106
I-680 to Montague Expressway	0.0035
Montague Expressway to Calaveras Boulevard	0.0049

The channel leaves the uplands at a gradient of about 3 percent and gradually reduces to a slope on the order of 1 percent at I-680. However, below I-680, the gradient abruptly decreases by a factor of 3 to 0.35 percent between I-680 and Montague Expressway. Below Montague, the slope increases to approximately 0.5 percent.

There are numerous bed controls throughout the project area. These are formed by bridges or box culverts with concrete bottoms, drop structures, and segments of channels lined with concrete. Figure 2-4 identifies locations along the profile that act as grade controls.

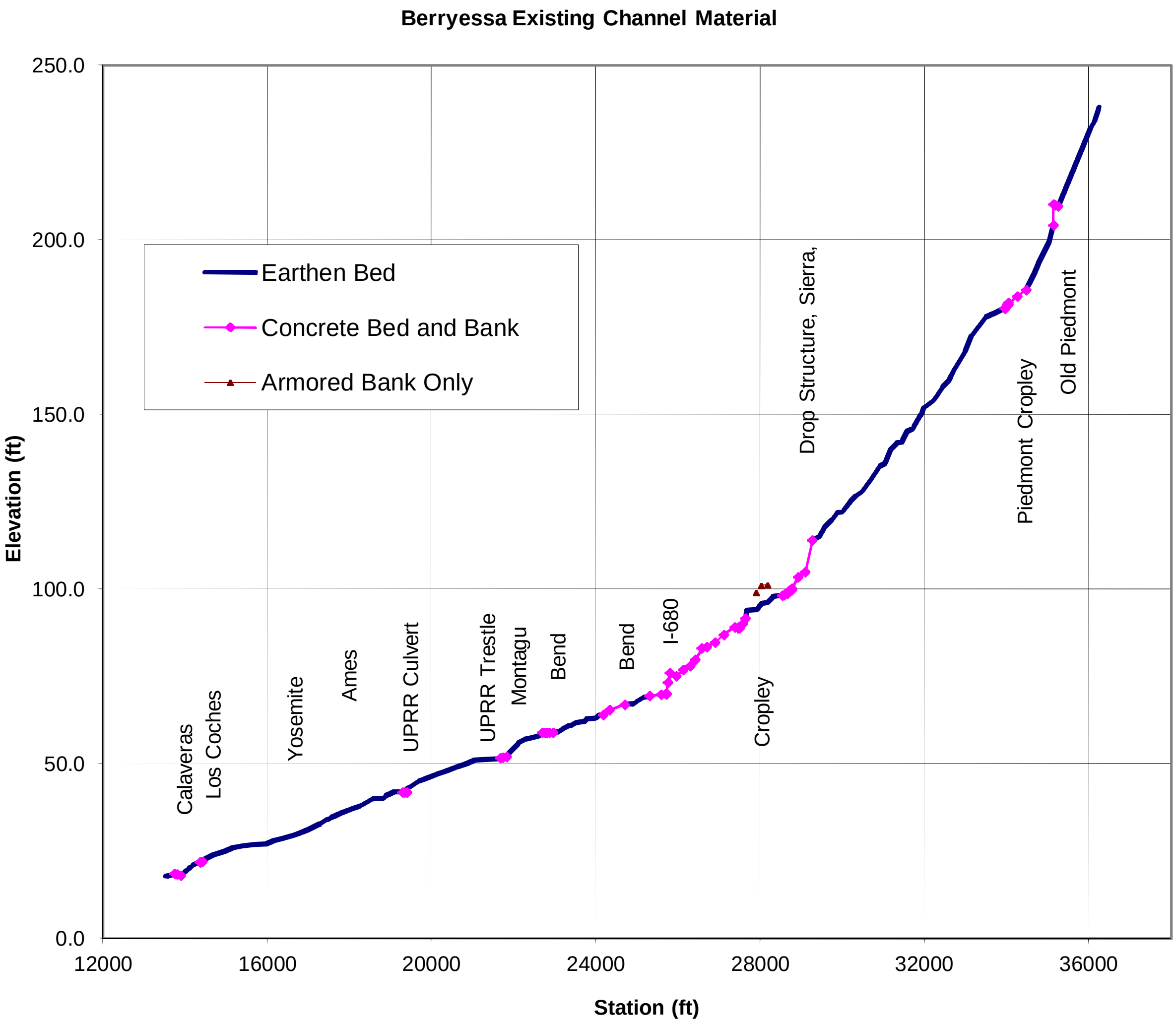

Figure 2-4 Location of Current Bed Controls along Berryessa Creek

The stream through the upper watershed was divided into five segments. Figure 2-5 provides a profile of the upland portion of Berryessa Creek. For the upper 1.3 miles, the gradient averages 6.5 percent. For about a mile, the gradient flattens to 3 percent. The gradient increases for the next two miles, averaging 8 percent with a gradual decrease in the downstream direction. The gradient then picks up as the stream crosses the Hayward Fault zone and passes through the "canyon" reach (Reach 4). The average gradient thought this segment is 8 percent with a portion of the stream near the center of the reach with a gradient of 15 percent. In the downstream 1,500 feet above Old Piedmont Road, Berryessa Creek transitions from the uplands to the alluvial fan with an average gradient of 4 percent.

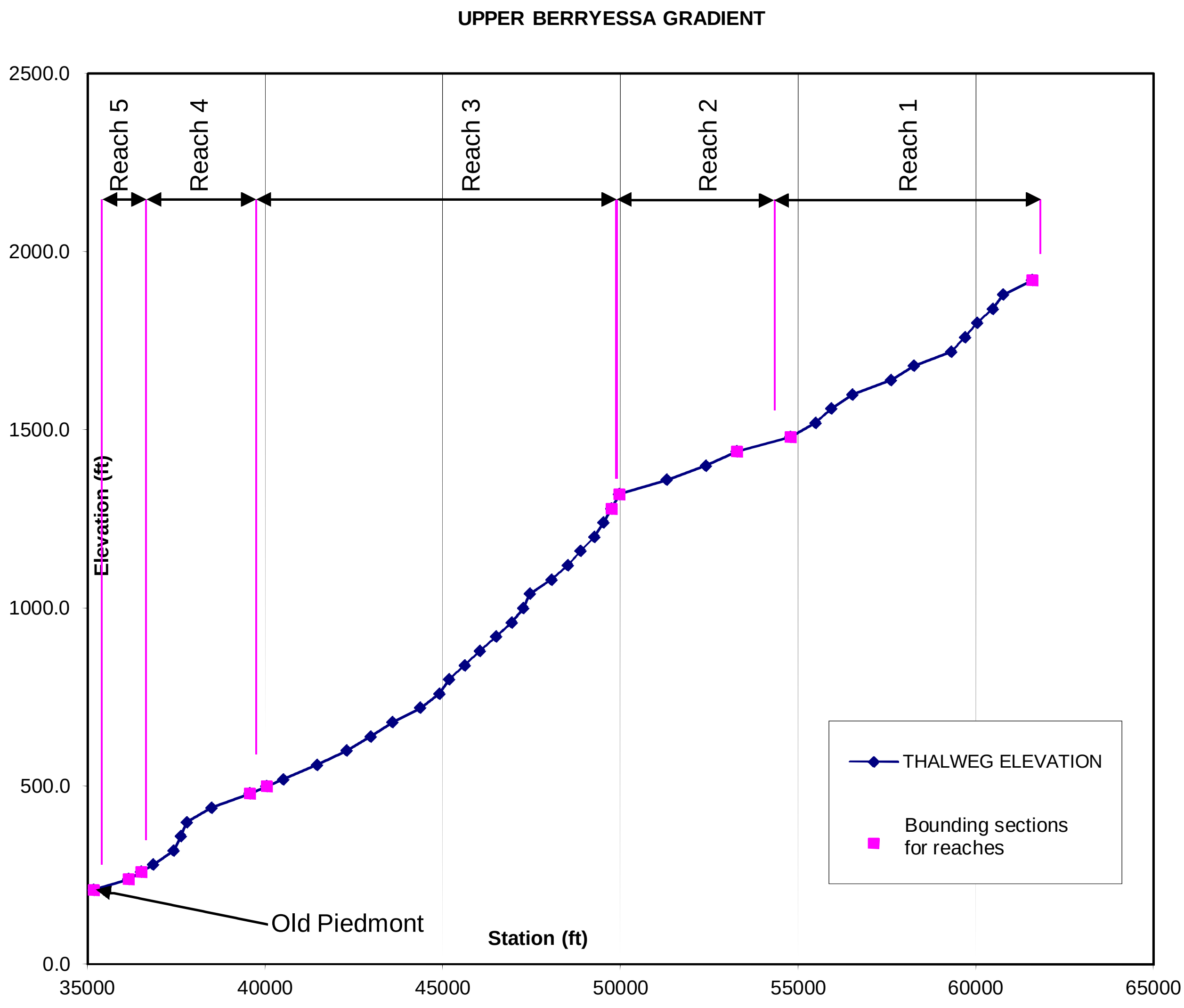

Figure 2-5 Berryessa Creek Profile from Old Piedmont Road to Headwaters

2.1.3 Channel Geometry

Within the project area, Berryessa Creek occupies a constructed channel that is heavily constrained by bridges, bank protection, channel lining and other constructed features. Thus channel dimensions are more a result of these influences as opposed to natural geomorphic processes. For description of the channel geometry, the project area was divided into eight reaches. During the analysis of the preliminary array of alternatives it was found that the portion of the project between Old Piedmont Road and I-680 was not justified and those portions of the project were removed from the final alternatives. Nevertheless, the six reaches between Old Piedmont Road and I-680 are described here to ensure continuity with the preliminary analysis completed prior to 2009. Descriptions of each reach are provided below. Additional details on channel cross sections can be found in the *Part I: Hydraulic Analysis of Alternatives* and *Part IV: Design and Cost of Alternatives* in this engineering appendix.

Calaveras Boulevard to Montague Expressway (Sta 138+03 to 217+38) – This reach is a straight, excavated earthen channel. It appears to have originally been excavated as a trapezoidal channel, but in some areas erosion and incision have resulted in the formation of steep, near vertical banks. The channel averages on the order of 10 to 12 feet in depth. The top width varies from a narrow 35 feet near the railroad trestle to on the order of 50 feet in other locations. The channel conveyance capacity ranges from 1,300 to 2,500 cfs.

Montague Expressway to I-680 (Sta 217+38 to 255+75) – This is another section of constructed trapezoidal earthen channel; with the exception that the channel bed and banks have been lined with concrete through the three 90 degree bends in this reach. The channel is approximately 40 feet wide with a depth of 7 to 8 feet. The conveyance capacity ranges from 800 to 1,500 cfs.

Upstream of the project area, the channel configuration and constraints vary significantly:

I-680 to Cropley Avenue (Sta 255+75 to 275+69) – This reach of Berryessa Creek is contained in a trapezoidal concrete channel with a top width on the order of 40 feet and a depth of 10 feet. These dimensions include the upper one to two feet of earthen material that continues to form channel sideslopes above the concrete. This segment of Berryessa Creek can contains approximately 2,800 cfs.

Cropley Avenue to Morrill Avenue (Sta 275+69 to 285+93) – This reach is a constructed trapezoidal, earthen channel with 2:1 sideslopes. The beds have been protected with concrete. The top width is on the order of 45 to 50 feet and the depth is typically 8 feet. The channel can contain flows up to approximately 1,500 cfs. The Cropley Avenue Bridge is a major constriction that creates a backwater upstream through much of the reach.

Morrill Avenue to Sierra Creek (Sta 285+93 to 292+00) – This reach is a combination of constructed channels. The downstream portion is a rectangular concrete channel with a 20 foot top width. The middle section is a trapezoidal channel with a gravel bed and banks protected by sacks filled with concrete. The top width is approximately 40 feet. The most upstream section is a drop structure that continues with banks protected by sacks filled with concrete, but has a concrete channel bottom. The top width of this segment is also approximately 40 feet. All three sections have depths on the order of 8 to 10 feet and contain flows up to approximately 1,500 cfs.

Sierra Creek to Piedmont Sediment Retention Basin (Sta 292+00 to 338+04) – This reach is referred to as the Greenbelt Reach. It contains the only section of channel that is not an excavated section constructed on an engineered alignment. The reach has only minor influences from bridges within its boundaries, with one pedestrian bridge crossing the channel without restricting it. The 20 to 30 foot wide channel varies from about 3 to 6 feet in depth. Portions of the channel have incised some, but banks remain stable due to vegetation and the silt and clay content which was reported to be roughly 50 percent (NHC 1990). Though the channel is free to meander within the 100 to 150 foot wide floodplain, the channel is fairly straight at a sinuosity of 1.06. The channel capacity is more representative of

a natural stream section in this reach than in other reaches with a bankfull capacity of approximately 500 cfs. The treed floodplain, which in some areas has berms and fill to help contain floods, can convey on the order of 1,300 cfs before flows breakout. Two tributaries, Crosley Creek and Sweigert Creek, enter in this portion of Berryessa Creek.

Piedmont Road Sediment Basin to Cropley Avenue (Sta 338+04 to 344+67) – This reach is comprised of two features. The downstream 250 feet is a sediment basin and the upstream 410 is a 12-ft by 7-ft concrete box culvert. To form the sediment retention basin, the channel has been widened and the banks protected to create an area to slow velocities and reduce shear stresses in order to collect upstream sediments. The sediment is then removed with construction equipment from the basin. The channel widens to 80 feet in the basin and has a depth that varies from 9 feet at the upstream end to about 6 feet as the basin transitions to the Greenbelt Reach. Santa Clara Valley Water District (SCVWD) records indicate that on the average nearly 527 cubic yards of sediment (see Table 2-1) are removed from the Piedmont Sediment Basin per year. The 410 foot long culvert that passes beneath the intersection of Piedmont Road and Cropley Avenue experiences deposition of coarse bed load from the build-up of material in the sediment retention basin. The basin will convey flows on the order of 1,500 cfs, but the culvert capacity is limited to passing approximately 900 cfs. The culvert capacity is often further restricted by sediment deposition within the culvert that can reduce the capacity to approximately 600 cfs or less.

Cropley Avenue to Old Piedmont Road (Sta 344+67 to 351+70) – This is an incised channel section with a width of approximately 40 feet and a depth of 10 feet. The channel banks in this reach have considerable gravel and small cobbles, though there is sufficient finer material for cementation to hold the banks near vertical. The channel capacity is approximately 1,500 cfs.

2.1.4 Current and Historical Channel Planform

The channel planform in the project area has undergone large changes since the middle of the 19th century. These are discussed in detail by NHC (2001) and summarized in this section. Of importance to understanding of the current conditions and the influences on the development of the flood control project is a comparison of the historic and current conditions. Before development, Berryessa Creek and its major tributaries flowed onto the alluvial fan for several thousand feet before spreading into distributary channels or infiltrating to the point that they were no longer shown on maps. As development increased, the streams were channelized to provide flood control and to supply irrigation water. It is also indicated that subsidence in the Santa Clara Valley may have contributed to the down fan progression of the defined stream channels.

By 1943, maps indicate that Berryessa Creek joined Penitencia Creek about 2 miles upstream of their current confluence. Significant realignment occurred between 1953 and 1961 when the creek was realigned to flow northward. This realignment placed the channel within its general flow path from the current I-680 crossing to Penitencia Creek. As a result of this realignment, the channel gradient was reduced from close to1 percent to less than 0.5 percent. The prior west flowing alignment was directly down the fan gradient whereas the realignment flows across the fan. This is the reason for the abrupt reduction in gradient

previously discussed for the reach mentioned from I-680 to the Montague Expressway. In 1976 the downstream-most portions of Berryessa Creek was realigned by the SCVWD as part of a flood control program. The current alignment from the fan apex to I-680 is close to that identified for 1943. The uppermost section of Berryessa Creek, from the apex to the middle of the Greenbelt Reach, is currently in the same general location as identified in 1899 maps.

2.1.5 Upper Watershed Site Inspection

An inspection of the Berryessa Creek watershed upstream of Old Piedmont Road was performed in August 2004. Participants in the field trip included representatives of the Sacramento District and Tetra Tech. The purpose of the field trip was to observe watershed and stream conditions that influenced sediment production and yield in order to develop potential strategies to reduce downstream sediment loading. More specifically the inspection was conducted to identify sediment sources, watershed processes controlling erosion and sedimentation, potential locations for sediment control facilities and the potential for land management activities to control sediment supply.

There were five distinct areas or zones observed in the stream and adjacent watershed. In the upper most 1.3 miles (Reach 1, upstream of the 1,480 foot contour), the creek is of moderately steep gradient averaging 6.5 percent and has a bed comprised of a wide range of material from gravels and cobbles to fines. The channel may be incised in some areas by several feet. There did not appear to be a high transport rate of the larger bed material (gravel and cobble) as there were few depositional bed features and there was a significant amount of finer material in the bed and heavy vegetation on the banks (Photo 2.1). On the hillsides, some minor gullying was observed where flow had been concentrated by roads or trails, but in the small gullies there were only a scattering of coarser materials so that it does not appear that this process is a significant source for coarser sediments in the upper portion of the watershed.

Photo 2.1 Typical Channel in Reach 1, Heavy Vegetation on Banks

The second segment of the channel (Reach 2) is relatively low gradient, particularly considering its location high in the watershed. This flatter section extends for approximately one mile at an average gradient of 3 percent, from the 1,480 foot contour on downstream to the 1,320 foot contour. Though the gradient flattens, the channel still has an incised appearance in areas. A significant depositional area of coarse material was not observed in this reach. This implies that the sediment production, of coarser materials is not high in the upper reach, otherwise the material would deposit in the area of reduced slope. The bed was comprised of sands and silts in portions of this reach, with only a scattering of angular gravels and cobbles (Photo 2.2). These larger materials may have fallen into the channel from the adjacent banks. In some areas where the bank material was exposed, there was a fairly heterogeneous matrix of material ranging from fines to small cobbles.

Photo 2.2 Typical Channel in Reach 2, Low Gradient

The third segment (Reach 3) of the upper channel starts as the stream gradient steepens and the channel becomes confined by steep hillsides. The bed material becomes dominated by gravels, cobbles and boulders with some bed rock outcroppings (Photo 2.3). The gradient was estimated at 8 percent for this reach which extends for approximately 2 miles to the 500 foot contour. Passage down the creek became difficult, so the inspection team walked along the hillside on the north side of the channel. At the several locations where the team returned to the creek bed, it was evident that the channel was capable of transporting materials up to boulders of over a foot in diameter. At several locations, bedrock was exposed in the channel and small falls were created. Though the watershed is very steep in this reach, the only landslides were observed near the downstream boundary of this reach. The south side of the valley wall is heavily forested while the north side is dominated by shrubs and grasses, except for a strip along the very bottom of the valley near the channel.

Photo 2.3 Typical Channel Section in Reach 3, Gradient of 8 Percent

Reach 4 begins where the stream enters what was referred to in previous reports (USACE 1993 and NHC 2001) as the canyon reach. The reach extends for approximately 0.6 miles at an average gradient of 8 percent with a short steep section of over 15 percent in the center of the reach. The most striking feature in this reach are a number of larger landslides that start hundreds of feet up on the hillside and continue down to the creek (Photo 2.4). These features are the largest concentrated sediment sources observed. The creek bed in this area is dominated by coarse material ranging from gravels and cobbles up to boulders on the order of 4 feet in diameter and greater. There is evidence that at times, the channel has transported debris torrents or flows. The formation comprising the surficial geology in this portion of the watershed is more susceptible to erosion and mass wasting than further upstream (Photo 2.5). This condition is further influenced by the Hayward Fault zone. The reduction in vegetative cover as elevation and rainfall decreases may also be a factor.

Photo 2.4 Mass Wasting Directly into Creek near Upstream Limits of Reach 4

Photo 2.5 Landslide Scarp on North Valley Wall in Reach 4 (Canyon Reach)

Reach 5 is a transition zone from the steeper upper watershed to the much flatter alluvial fan. The average gradient through this 0.3 mile reach is 4 percent. The channel bed in this reach is still comprised of material ranging from gravels to large boulders (Photo 2.6). Most or all of the larger boulders generated upstream appear to be deposited in this reach and do not cross Old Piedmont Road.

Photo 2.6 Typical Reach 5 Channel in Transition from Uplands to the Alluvial Fan

2.1.5.1 Implications of Watershed Inspection

Based on the observations during the site visit, control of sediments from the upper two segments (Reaches 1 and 2) of the watershed would have minor influence on delivery of coarse sediments (gravel and cobbles) to the reaches below Old Piedmont Road since it appears very little of this size material would make it through the flatter gradient of Reach 2. Sands and finer sediments may be produced in these areas, but their relative contribution would appear to be smaller than the portions of the watershed further downstream.

Based on the coarse bed material and steep gradient in Reach 3, a significant amount of gravel and cobble can be transported through this reach. However, no large point sources were identified. The team did not walk this portion of the creek bed so it could not be observed if there were large areas of bank erosion or contributions of sediments from point sources along the creek. This statement is based mainly on the lack of gullies crossed in walking along the north side of the valley wall and no visual identification of larger landslides on either the north or south valley wall. Construction of a sediment retention facility in this reach would be difficult due to the limited access and the small amount of storage volume per foot of structure height because of the steep channel gradient and steep confining valley walls.

Reach 4, the 0.6 mile length of the creek and associated watershed above Old Piedmont Road, appears to be the most significant area of sediment production. This is the area that several large point sources of sediment were identified, in the form of landslides in which feed directly into the creek. If a sediment retention or trap facility were to be constructed, it would appear that the best location would be in Reach 5 as the gradient decreases and the area adjacent to the channel increases. This area would control the large contribution of sediment from Reach 4. Lastly, this area has the best access for construction and maintenance.

In terms of land management, much of the upper watershed is grazed. There are a few residences, mainly along the watershed divide. The primary road serving the watershed travels near the watershed divide and in the majority of locations is in the adjacent watershed. There did not appear to be significant erosion problems created by any of these watershed disturbances. For example, there were no gullies observed as the result of concentration of flows from roadside drainage or from residential development. Likewise, there was no evidence of significant rilling or gullying occurring on the grazing lands or of trampling of streambanks by livestock. However, the influence of grazing was quite apparent with numerous trails contouring the hillsides and some locations with hillsides covered with hoof imprints left from the rainy season. Any control measures adopted to limit grazing activities along the channel banks would primarily reduce the fine sediment yield.

2.2 Summary of Sediment Transport Conditions

This section presents information on the current sediment transport conditions for the project area and upstream reaches that were presented in previous studies. The sediment removal history is also reviewed. The results of the hydraulic analysis for the with-project alternatives are utilized to qualitatively determine changes in sediment transport and removal requirements that would be induced by the project.

2.2.1 Previous Studies - Sediment Budget and Modeling

Previous analyses of the sediment budget (HMC 1990), geomorphology (NHC 2001) and sediment transport (NHC 2003) for the without-project condition of Berryessa Creek indicated two potential problems. The first was potential areas of deposition and the second was potential areas of degradation.

2.2.1.1 1990 Sediment Budget Analysis

An overall estimate of the sediment yield for Berryessa Creek was developed by NHC (1990). The results of this analysis indicated the following sediment yields:

Berryessa Creek at Old Piedmont Road	=	9,900 tons/year
Sweigert, Crosley, and Sierra Creeks	=	1,900 tons/year
Piedmont Creek	=	700 tons/year
Arroyo de los Coches	=	3,200 tons/year

The values provided for the tributaries are at their confluence with Berryessa Creek. The total yield is 15,700 tons/year. If a dry unit weight of 100 lbs/ft^3 is assumed for sediments, this represents 11,600 cubic yards per year.

The sediment budget performed by NHC (1990) estimated the mean annual inflowing sediment load at Calaveras Boulevard to be 9,200 tons/year or 6,800 cubic yards per year. This budget was based on deposition of 6,700 tons/year of sediment between Piedmont Road and Calaveras Boulevard. The study utilized a value of 5,000 cubic yards per year of sediment removal upstream of Calaveras Boulevard.

It should be noted that the 1990 study used a value of 23,800 cubic yards of sediment removed in 1983 between Sierra Creek and Calaveras Boulevard.

2.2.1.2 2001 Geomorphology Study

In 2001 NHC updated the 1990 sediment budget analysis (NHC 2001). One major change aside from the additional sediment removal data available was that the large value of 23,800 cubic yards of sediment removed in 1983 between Sierra Creek and Calaveras Boulevard was not included. If this large volume of removal is not included, the average annual rate for the 10-year period referenced in the 1990 Sediment Budget Analysis (NHC 1990) would be 2,620 cubic yards per year or 3,200 tons/year (NHC assumed 90 lbs/ft^3 for deposited sediments). This change in assumptions and additional sediment removal data resulted in the

sediment budget resulting in 12,400 tons/year of sediment passing Calaveras Boulevard as opposed to the 9,200 tons/year as indicated in the 1990 study.

2.2.1.3 2003 Sediment Transport Modeling

In 2003 estimates of sediment yield and budget were developed by NHC based on an HEC-6T sediment transport analysis (NHC 2003). The sediment yield was computed by integrating the HEC-6T simulated bed material load yields for the single storm events to determine average annual yields utilizing the method described by Mussetter *et. al.* (1994). This resulted in an average annual bed material yield at Old Piedmont Road of 2,500 to 3,000 tons per year. The overall budget identified a total of 170 tons per year of net erosion from the reach, indicating this reach is currently slightly degradational. This minimal amount of degradation translates into an average of 0.05 inches per year if the total volume were to be spread out over the entire reach. The sediment budget presented in the 2003 report did not indicate it accounted for sediment removal that takes place at several locations throughout the reach. The budget also did not provide an indication of the simulated tributary inflows and how or if they were accounted for in the budget.

2.2.1.4 Analysis of Previous Studies

If the 9,900 tons per year average annual sediment yield at Old Piedmont Road computed in the 1990 Sediment Budget Analysis is assumed to be 35 percent bed material load (sand, gravel and cobble) and 65% wash load (silts and clays), the resulting average annual bed material supply at Old Piedmont Road is 3,500 tons. This is in fairly close agreement with the 2003 HEC-6T Sediment Transport Study which indicated an average annual upstream loading on the order of 2,500 tons per year. In terms of the sediment balance in the reach, the HEC-6T modeling by NHC indicated a slight degradational trend. However, the modeling did not appear to include the sediment removal in the analysis. Accounting for sediment removal increases the degradational trend by several thousand tons per year. An overall degradational trend is supported by comparisons of the 1968 and 1998 channel thalweg profiles in the 2001 Geomorphic Study (NHC 2001). Comparison of these profiles indicates that the 1998 profile is at or below the 1967 profile throughout the project area. Continued sediment removal prevents the areas of deposition from being revealed on the profile comparison.

Because of the highly manipulated nature of the Berryessa Creek channel within the project area, its ability to transport sediment varies widely. Though there are segments of considerable deposition that require sediment removal to maintain flood conveyance capacity, there are areas with higher sediment transport capacity that result in channel degradation. This is supported by the comparison of the 1967 and 1998 thalweg profiles presented by NHC in the 2001 Geomorphic Study. The 2003 HEC-6T sediment modeling results show similar behavior with a slight overall trend for degradation, but a mixture of aggradation and degradation scattered throughout the project area.

The 2003 HEC-6T model results indicated that the bed material load from a single 1% chance exceedance event would be on the order of 13,000 tons at Old Piedmont Road, which is on the order of four to five times the estimated average annual bed material loading. During a 1% chance exceedance event, the maximum predicted aggradation is over 4 feet at the Piedmont/Cropley culvert and over 2 feet just upstream of the Ames Avenue Railroad trestle. At all other locations the aggradation is on the order of one foot or less. The maximum predicted degradation is 2 feet in the Greenbelt Reach just downstream of the sediment basin and just over one foot about 500 to 1,000 feet upstream of Los Coches Street. Based on these results the modeling indicates a mixture of aggradation and degradational areas. Though the actual historic profiles indicate primarily equilibrium or degradational reaches, the model did not appear to account for the sediment removal in the aggradation areas. If all sediment deposits indicated by the model results are removed, the required sediment removal predicted by the HEC-6T model would be on the order of 3,700 cubic yards per year. A further discussion of actual sediment removal history is presented in the next section.

2.2.2 Sediment Removal History

The SCVWD performs removal of sediment on an as needed basis to maintain the conveyance capacity of Berryessa Creek throughout the project area and upstream reaches. The two concentrated areas of removal upstream of the project area are the sediment retention basin below Piedmont Road and the reach between the Sierra Creek confluence downstream to Cropley Avenue. Additionally, sediment is removed at various locations throughout the project area. Table 2-1 presents the reported maintenance records of sediment removal from five reaches within the Berryessa Creek channel. The sediment removal for the study area between Old Piedmont Road and I-680 is divided into two reaches, the sediment retention basin below Piedmont Road and the area from Sierra Creek to Cropley Avenue. The sediment removal for the study area downstream of I-680 is also subdivided into two areas; I-680 to Montague Expressway and Montague Expressway to Calaveras Boulevard. The final reporting reach downstream of Calaveras Blvd and is outside of the project area.

Based on 33-years of maintenance records from 1977 to 2011 the most concentrated area of sediment deposition in the study area is at the sediment retention basin below Piedmont Road. In this several hundred foot long reach, an estimated average annual removal of 527 cubic yards occurs. This is the highest removal at any location in the study area and also represents the shortest stream reach of all the removal areas. The next highest sediment removal area is Sierra Creek to Cropley Avenue. In this 1,600 foot long reach, the estimated average annual removal is 525 cubic yards. In the 3,600 foot long reach from I-680 to Montague Expressway, the level of sediment removal is slightly less than the two upstream sites at 430 cubic yards per year. The lowest annual sediment removal is found in the downstream-most reach in the study area, from Montague Expressway to Calaveras Boulevard, an annual average of 205 cubic yards is removed in its 7,700 foot length.

Table 2-1 Summary of SCVWD Sediment Removal Maintenance Records on Berryessa Creek (NHC 2001 and SCVWD)

Year	Removal in Deposition Areas (cu. yd.)					Total (cu. yd.)
	DS of Calaveras	Montague to Calaveras	I-680 to Montague	Cropley to Sierra Creek	Piedmont Sed. Basin	
1977	0	0	0	0	0	0
1978	0	0	0	0	0	0
1979	0	0	0	0	0	0
1980	0	0	0	0	0	0
1981	4,210	4,100	0	0	0	8,310
1982	23,510	0	2,890	0	0	26,400
1983	0	0	0	0	0	0
1984	19,500	0	0	0	0	19,500
1985	14,352	0	1,136	1,137	1,137	17,762
1986	460	1,320	0	3,260	900	5,940
1987	9,820	800	250	0	0	10,870
1988	0		0	10	2,724	2,734
1989	13,330	400	0	432	0	14,162
1990	10,520	0	0	0	0	10,520
1991	4,066	0	0	0	300	4,366
1992	0	0	0	0	0	0
1993	2,800	0	0	2,500	1,250	6,550
1994	0	0	0	0	0	0
1995	0	0	0	0	0	0
1996	0	0	0	0	5,600	5,600
1997	30,000	0	0	700	810	31,510
1998	0	0	0	3,850	1,000	4,850
1999	1,250	0	8,850	0	0	10,100
2000	0	0	0	0	1,300	1,300
2001	7,189	0	0	3,165	1,525	11,879
2002	0	0	0	0	0	0
2003	4,640	0	0	0	0	4,640
2004	7260	0	20	0	450	7,730
2005	0	0	0	0	0	0
2006	0	90	0	1,744	930	2,764
2007	6,320	67	500	0	0	6,887
2008	0	0	964	0	0	964
2009	0	0	0	0	0	0
2010	0	0	0	1,040	0	30,040
2011	34,000[1]	0	0	0	890	34890
Average Annual	5,521	199	417	509	537	7,179
Totals	193,227	6,777	14,610	17,838	18,816	251,268

Note: 1. Maintenance has been deferred for the reach downstream of Calaveras from 2008 to present pending reconstruction of the reach by SCVWD. The current estimate by the SCVWD Water Operation Staff of 34,000 cubic yards of sediment in this reach is used to account for this deferred maintenance. (SCVWD 2011a)

The sediment deposition basin below Piedmont Road was developed to collect sediment as the channel leaves the upstream watershed and flows onto the alluvial fan. At the Piedmont Road sedimentation basin, the channel gradient has been reduced and the width increased to form the basin. In the Sierra Creek to Cropley Avenue reach, a combination of drop structures, energy dissipaters and restrictive bridges, as well as the possibility of supply of additional sediments from the Greenbelt Reach and Sierra Creek, result in an area of concentrated deposition. Below I-680, the overall gradient dramatically decreases by a factor of 2 to 3 compared with the reach from Cropley Avenue to I-680. As a result of this gradient reduction, the reach is subject to aggradation in areas where the channel widens or flows are backwatered upstream of restrictive bridges.

The results of the 2003 Sediment Transport Modeling were compared to the maintenance records sediment removal results presented in Table 2-1. In order to compare the two analyses, the results for the SCVWD sediment removal reaches reported in Table 2-1 were developed from the 2003 HEC-6T modeling. Note that the reported HEC-6T model estimated volumes do not include some areas of lesser deposition not included in Table 2-1, resulting in the total estimated average annual deposition for the sediment removal reaches not equaling the 3,700 cubic yards per year reported for the study area in the previous section. The resulting average annual sediment removal volumes for the SCVWD sediment removal reaches predicted in the HEC-6T model are listed in Table 2-2.

Table 2-2 Comparison of SCVWD Sediment Removal Records and NHC 2003 HEC-6T Sediment Transport Modeling

Sediment Removal Reach	Average Annual Sediment Removal Estimates (Cubic Yards per Year)		
	SCVWD Maintenance Records	**2003 NHC HEC-6T Modeling**	**Percent Difference from SCVWD Records**
Piedmont Sediment Basin	527	890	69%
Sierra Cr. to Cropley Avenue	525	390	-26%
I-680 to Montague Expressway	430	720	67%
Montague Expressway to Calaveras Boulevard	205	860	319%
TOTAL	**1,687**	**2,860**	**69%**

The 2003 Sediment Transport Modeling results reported in Table 2-2 are approximately 70 percent higher than those reported by SCVWD maintenance records for the total study area and of the two removal reaches. The only reach underestimated by the 2003 HEC-6T modeling in comparison to maintenance records is from Sierra Creek to Cropley Avenue where the HEC-6T results indicate 390 cubic yards and the maintenance records identify 525 cubic yards per year. In contrast, the HEC-6T model overestimates the required sediment removal in the Montague Expressway to Calaveras Boulevard reach by over 319%.

It should be noted that significant sediment deposition requiring removal occurs in the 8,500 foot reach from Calaveras Boulevard downstream to the Penitencia Creek confluence. This reach is tidally influenced and therefore sediment deposition is expected. In the GDM (USACE 1993), based on removal records from 1981 to 1990, the removal in this reach was equal to the total removal for all upstream reaches averaging 5,000 cubic yards per year.

Correspondence from the SCVWD indicated sediment removal operations has been performed downstream of Calaveras Boulevard eight times since 1990 with removal volumes ranging from 1,250 cubic yards in 1999 to 30,000 yards in 1997. In addition, recently sediment maintenance activity has been deferred for this reach because of pending reconstruction activity by SCVWD. To account for the sediment deposition in the reach from 2008 to present, the SCVWD Water Operation Staff has estimated that the volume of sediment that would have been removed for routine sediment operations in the reach is 29,000 cubic yards (SCVWD 2011a). The addition of the sediment removal activity since 1990 results in an average annual sediment removal of 4,683 cubic yards per year for Berryessa Creek from the confluence of Penitencia Creek to Calaveras Boulevard.

In evaluating the influence of with-project alternatives, consideration must be given to the portion of Berryessa Creek downstream of the project limits. Two important aspects of the sediment balance need to be incorporated into the overall project evaluation. First, if additional sediment is generated from bank erosion or bed degradation in the project area, if it is not deposited in the project area, most of the sediment would be deposited in the reach below Calaveras Boulevard. Second, any reduction in maintenance requirements that results from increasing sediment transport capacity within the project area will pass sediment through the project area, but will result in increased deposition in the reach below Calaveras Boulevard.

CHAPTER 3: WITH-PROJECT CONDITIONS

This chapter applies the information from the existing conditions assessment of geomorphology and sediment transport investigations to identify design considerations and issues to be addressed in the with-project alternatives. Results of the hydraulic analysis of the without and with-project alternatives are compared to qualitatively identify potential channel responses. The information is applied to identify recommendations as to potential modifications or refinements of the with-project alternatives. Sediment management features between Old Piedmont Road and I-680 are not part of the current project but are under consideration by others. These features are included herein for discussion purposes as the sediment supply through the upstream reaches affects the configuration of sediment management features in Alternatives 2A/d, 2B/d and 4B/d downstream of I-680.

3.1 Design Issues and Considerations

The following section identifies the issues or considerations, and then provides recommendations as to how they may be addressed in the alternatives. The general categories of issues to address are:

- Management of coarse sediment
- Minimize aggradation and degradation
- Provide opportunities for environmental enhancement

3.1.1 Management of Coarse Sediment

The Berryessa Creek Project Area extends from I-680 to Calaveras Boulevard and lies within an alluvial fan. Alluvial fans are created by sediment deposition as streams carrying large sediment loads exit the steep confined channel of the uplands and meet the lower gradient unconfined valley. As a result, sediment deposition is an inevitable process on an alluvial fan and any channel improvements must recognize this behavior. On the Berryessa Creek fan, at some point, between the apex of the fan and the Bay, all but the finest sediments will be deposited. Since the gradient decreases in the downstream direction along the fan, and the ability to transport sediment decreases along with it, the larger sediments are deposited furthest upstream.

Deposition in the project area currently requires on the order of 1,046 cubic yards per year of sediment between Old Piedmont Road and I-680 and 616 cubic yards per year of sediment downstream of I-680 be removed. Additional sediment deposits are also removed downstream of the project area. Even if a concrete channel that confined all the flow and maximized velocities and shear stresses were installed, though the coarse sediments would be conveyed further, they would either deposit in the lower gradient project area downstream of I-680 or in the tidally influence reach further downstream. Therefore at some point along Berryessa or Penitencia Creek, the sediments become a maintenance issue because removal is required to maintain flood conveyance capacity and prevent the eventual plugging of the

channel. Coarse sediment management approaches to be considered include reducing the supply of sediment and promoting sediment deposition in areas that will not induce flood problems and are readily accessible to perform periodic sediment removal.

3.1.2 Reduction of Coarse Sediment Supply

Coarse sediment supply is generated primarily upstream of the project on the mainstem of Berryessa Creek and passes through the bridge at Old Piedmont Road. Additional quantities of sand and gravel are supplied by the larger tributaries and some sediment may be generated from channel degradation and bank erosion within the project area. Inspection of the upland watershed and information contained in past studies indicate that the majority of coarse sediment is generated in the lower steep canyon reaches (Reach 4) of Berryessa Creek as a result of mass wasting and erosion of the steep hillsides immediately adjacent to the creek. Because of the scale of these sources and the fact that they are a result of natural process and conditions, including the presence of active fault zones and unstable geologic formation, controlling the coarse sediment supply at its source is not practical.

Another option would be to create a sediment retention basin upstream of Old Piedmont Road in the transition zone from the steep canyon to the alluvial fan. This is the zone that the large boulders that may be transported in debris torrents and flows are deposited in. Additionally, smaller boulders and cobble are also deposited in this area. The 1989 Authorized Plan and 1993 GDM (USACE 1993) included a sediment basin at this location with a capacity of 17,000 cubic yards which exceeds the volume of sediments deposited in a 1% chance exceedance event (12,000 cubic yards) plus the average annual sediment deposition (3,000 cubic yards).

The difficulty with such a large basin is that it would trap nearly all of the sediments from sand size and larger. This would result in the “hungry water” released from the sediment basin picking up sediments further downstream which would result in bed and bank erosion. This would likely cause the channel through the Greenbelt Reach to become incised and less connected to its floodplain. In the case of the channel design presented in the 1993 GDM, a concrete channel would be installed downstream of Old Piedmont Road. The concrete channel would have prevented bed degradation and bank erosion. However, with the “natural” channel bottom being proposed in the current with-project alternatives, the bed would be subject to degradation. Thus installation of a large sediment basin above Old Piedmont Road does not appear to be compatible with the implementation of a project with an alluvial bed. Given the limitations of a sediment basin at this location, a debris trap is considered as a possible future refinement of the GDM design. For the purposes of this study, the sediment basin upstream of Old Piedmont Road was analyzed as designed in the 1993 GDM since this was a component of the Authorized Project which needs to be analyzed as designed.

3.1.3 Debris Torrents and Flows

Based on site observations and past reports (USACE 1993 and NHC 2001), the potential for transport of large boulders in the form of debris torrents and flows exists. It appears that this

material is transported almost as far as the Old Piedmont Road crossing and could cause problems with the culvert. To reduce the possibility of plugging the culvert, which could result in the flows breaking out of the channel, an installation of a debris fence or other permeable structure designed to strain debris flows will be investigated upstream of Old Piedmont Road during the next phase (design of the selected plan) of the GRR. Such a structure would catch the larger material but allow passage of the majority of cobble and finer material. The structure would have little influence on normal flows. By only catching the larger material and debris, the volume of storage behind the structure is much smaller than for a sediment basin. Additionally, since it passes the majority of the sediment load, it does not have the potential to induce channel degradation downstream. The structure will need access for removal of trapped material; however, removal will only need to be performed after large events that mobilize boulders. The inclusion of the debris fence would not affect plan selection.

3.1.4 Coarse Sediment Management within the Project

Currently, coarse sediment is managed in the project by periodic removal of deposits. In most cases, sediment is removed from locations within the project area on an as-needed basis. The sediment retention basin upstream of the project area at Piedmont Road has been designed to facilitate sediment removal. This basin collects bed material load by providing a wide area with reduced flow velocity and shear stress. The capacity of the basin is on the order of 1,000 to 1,500 cubic yards. A significant problem with the basin is that once sediments start depositing in the basin, they quickly create a backwater that causes sediment to deposit in the 410 foot long culvert immediately upstream. This reduces the flood conveyance capacity of the culvert, which can result in flows breaking out upstream of the culvert at much lower return periods and increasing the frequency of flooding. In addition, it is extremely difficult to remove deposits from the culvert due to the limited workspace and clearance.

Several modifications should be considered for the basin to improve its performance. Potential modifications include regrading the basin to have a steep slope immediately downstream of the culvert outlet. This would provide sediment storage below the culvert invert and reduce the tendency for deposits to build up in the culvert. Additionally, the culvert invert could be altered to have a V-bottom. This would help concentrate flows and increase the transport capacity during low flows. Another potential option is to move the basin a short distance downstream so that there is some distance between the basin and the culvert outlet. The area between the two features should have a steep slope to prevent backup of deposits into the culvert. It is noted that increasing the storage volume of the basin may not be a good option. A significant increase in the volume would increase the trap efficiency which could induce channel degradation and incision in the Greenbelt Reach.

Accommodating the steep chute below the culvert or the shifting of the basin further downstream would require lowering the basin and possibly alteration of some of the channel in the Greenbelt Reach. Changes to the channel in the Greenbelt Reach should be analyzed carefully and kept to a level that does not create problems with the stability of this reach. Potential problems that would have to be mitigated would be reduced stability after

disturbing the vegetation on the banks and increased flow confinement if the channel was lowered.

In addition to improvements to the Piedmont sediment retention basin, additional coarse sediment management might be provided by creation of locations that were designed to conduct sediment removal operations. This would involve providing access to the channel bottom and possibly altering channel hydraulics to encourage sediment deposition. Based on historical sediment removal, likely locations would be between the Sierra Creek confluence and Cropley Avenue crossing and between I-680 and Montague Expressway. Sediment transport modeling of these facilities would be necessary to ensure that they function properly and do not trap so much sediment that downstream degradation problems are created. Additionally, locations for the facilities should be determined after sediment transport modeling of the with-project condition since the channel alterations under the with-project condition may alter the locations most prone to sediment deposition.

A high-flow bypass culvert running beneath Cropley Avenue is being considered by the SCVWD to reduce flooding in the Greenbelt reach. Detail planning for the SCVWD bypass plan has not been completed at the time of this study. Approximate sediment management implications are presented in this report and will be added to future design reports. The bypass alternative was only considered for the design of Alternatives 2B/d and 4/d.

3.1.5 Minimize Channel Bed Aggradation and Degradation

Berryessa Creek has areas that experience aggradation and others that have experienced degradation. If not properly accounted for, alteration of the system for flood control has the potential to increase either or both of these processes at various locations within the project area.

3.1.5.1 Flow Confinement

Confinement of higher flows to a limited area by excavation of a larger channel or construction of levees increases shear stresses which can mobilize larger sediments and increase transport rates. As a result, the flows erode sediments from the bed to satisfy the increase in sediment transport capacity. These sediments may be deposited downstream when the flows reach a portion of the channel where the hydraulic conditions become less severe. Evaluation of the Berryessa Project alternatives needs to account for this potential since much of the project involves measures that increase the flow confined to a main channel.

Sediment transport analysis and modeling should be conducted to refine the design of the selected alternative to assess areas where this may be a problem. If such locations are identified, then the channel dimensions need to be modified to reduce the potential for degradation. If this cannot be done, while maintaining flood control objectives, then the inclusion of grade controls to limit future degradation should be considered.

3.1.5.2 Channel Widening

In some cases excavation of a wide channel to create sufficient cross-sectional area to pass the design flows can actually result in reducing sediment transport capacity for smaller events. Though very large floods pass a greater amount of sediment on a single event basis, smaller flows, owing to their greater frequency of occurrence, are typically responsible for the greatest portion of sediment transport over the long term. The flood responsible for the greatest portion of sediment transport is referred to as the dominant or formative discharge and often ranges between the 20- to 75% chance exceedance events. Therefore, a reduction in sediment transport capacity at the lower return period floods, by spreading across the wider channel bed, may off-set the increase in sediment transport capacity created by confining the larger floods to the enlarged channel. Depending on the magnitude of the changes, the two factors may offset creating a condition of dynamic equilibrium or the change may be so large as to shift the channel into an aggrading mode. In some widened channels, alternate bars may form during low flows that become vegetated and cannot be removed at higher flows in some reaches. Though the channel might have the capacity to transport the sediment stored in the bars, the vegetation in some reaches prevents them from becoming scoured and they may need to be removed as part of a maintenance program. Since portions of the Berryessa Creek channel are widened, this behavior is also a possibility.

Sediment transport analysis and modeling for the selected alternative should identify any areas where channel widening is causing excessive degradation. If such locations are identified, the design should determine whether the channel can be narrowed while still meeting flood control objectives. This may require increasing levee or floodwall heights. In the former case, additional right of way may be needed to accommodate the wider levee footprint. Additionally, the evaluation should consider whether the problem could be remedied by slope alteration or modification to downstream structures that constrict the flow and cause backwater into the area of concern.

3.1.5.3 Gradient Alteration

The current channel gradient varies dramatically from near 3 percent at the upstream end to below 0.5 percent at the downstream end. Though there is a strong trend for decreasing gradient in the downstream direction, there are localized areas where the gradient changes abruptly. This is partially due to the wide range of channel configurations currently found in the project area. At the current level of design, the proposed channel sections have been superimposed on the existing channel gradient. In the next level of design, the profile needs to be refined considering minimizing changes in sediment transport capacity that result from local variations in the gradient. Additionally, this exercise will likely have benefits to the providing the most efficient flood control design.

3.1.5.4 Structures

Numerous structures are located throughout the project area and upstream reaches, including 13 stream crossings and several energy dissipators. Some of the bridges create constrictions that result in backwater and induce sediment deposition upstream. It is believed that the

modifications to these bridges to provide passage of floods should solve these problems, but sediment transport modeling should still be performed to substantiate this. Because of the channel alterations, the energy dissipation structures will be removed by others and will not be a factor under the with-project condition.

3.1.6 Provide Opportunities for Environmental Enhancement

Though the purpose of the project is flood control, environmental features have been identified as important aspects to local stakeholders. Therefore existing areas with higher environmental values should be preserved and in other areas it may be possible to increase the environmental values over current conditions. Channel morphology and sediment transport aspects of the channel design can play a role in preventing loss of existing high environmental value areas and to enchaining the environmental values in other areas. For example, the Greenbelt Reach upstream of the project area has environmental values that are not found in the project area. However, this is the reach that would likely be most susceptible to increase in changes in sediment supply. In other portions of the channel, creation of benches to provide at least limited floodplain can provide environmental enhancement. Also, the design of the channel influences the aquatic habitat. The most significant opportunities to provide environmental enhancement that relate to sediment transport, geomorphology and channel stability are listed below:

- Create a channel with an alluvial bed
- Utilize vegetation to the extent possible to provide bank stability
- Develop a main channel that conveys flows that are on the order of the 50% chance exceedance event
- Provide an area adjacent to the main channel that serves as a floodplain
- Promote growth of vegetation on the floodplain
- Avoid overly wide channels that spread flows very shallow

These opportunities have all been taken advantage of in alternatives 4B, with the extent of vegetation dependent on the further selection of vegetation types for the benches. Alternative 2B incorporates an alluvial channel and may incorporate some vegetation, but does not address the other environmental opportunities listed.

3.2 Qualitative Evaluation of Sediment Transport

This section presents a qualitative assessment of changes in sediment transport conditions and the potential changes in channel response based on comparisons of with- and without-project hydraulic conditions. The two hydraulic parameters chosen to perform the evaluation are velocity and shear stress. Sediment transport is sensitive to these parameters with sediment transport capacity typically increasing with velocity raised to a power of 3 to 5. Shear stress determines the sizes of bed material that can be mobilized. The qualitative evaluation of sediment transport is presented for the preliminary array of alternatives and for the final array of alternatives.

3.2.1 Preliminary Array of Alternatives

As described in Section 2.1 and Chapter 4 of *Part I: Hydraulic Analysis of Alternatives* of this engineering appendix, HEC-RAS models were developed to model the without-project condition and preliminary array of alternatives. To assess potential changes in sediment transport conditions within the project area, velocity and shear stress values from the original GRR methodology (see Section 2.1 of *Part I: Hydraulic Analysis of Alternatives* of this engineering appendix) HEC-RAS models were compared from reach to reach along the channel. The plots were reviewed for without-project baseline and the with-project alternatives. The velocity plots are presented in Figure 3-1 and Figure 3-2 for the 50% chance exceedance events and Figure 3-5 and Figure 3-6 for the 1% chance exceedance events. Similar shear stress versus project station plots are provided in Figure 3-3 and Figure 3-4 for the 50% chance exceedance events and Figure 3-8 for the 1% chance exceedance events. All figures have been separated into two plots (part 1 containing baseline, Alternatives 2A, 3A, and 3B and part 2 containing baseline, Alternative 4B and Alternative 5), plotted at the same scale, to facilitate easy comparison with baseline conditions. Results have been smoothed with running average values over two cross sections upstream and downstream of each station. Sections 2.1.2 and 4.3 of Part I: Hydraulic Analysis of Alternatives of this engineering appendix contains more comprehensive results for the original GRR methodology without-project and preliminary alternatives.

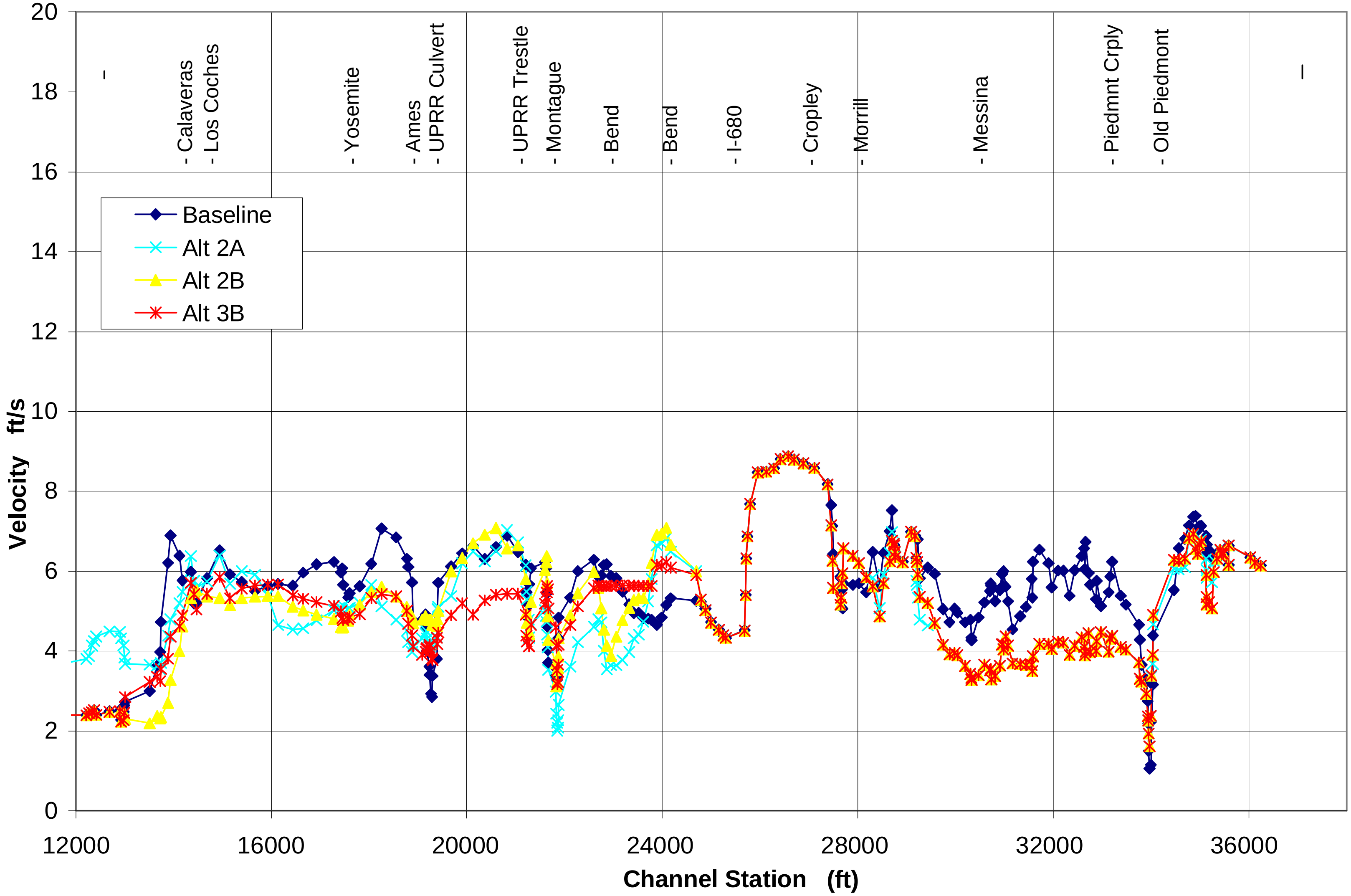

Figure 3-1 (Part 1 of 2) – Main Channel Velocity for Without- and With-Project Conditions, 50% Chance Exceedance Event

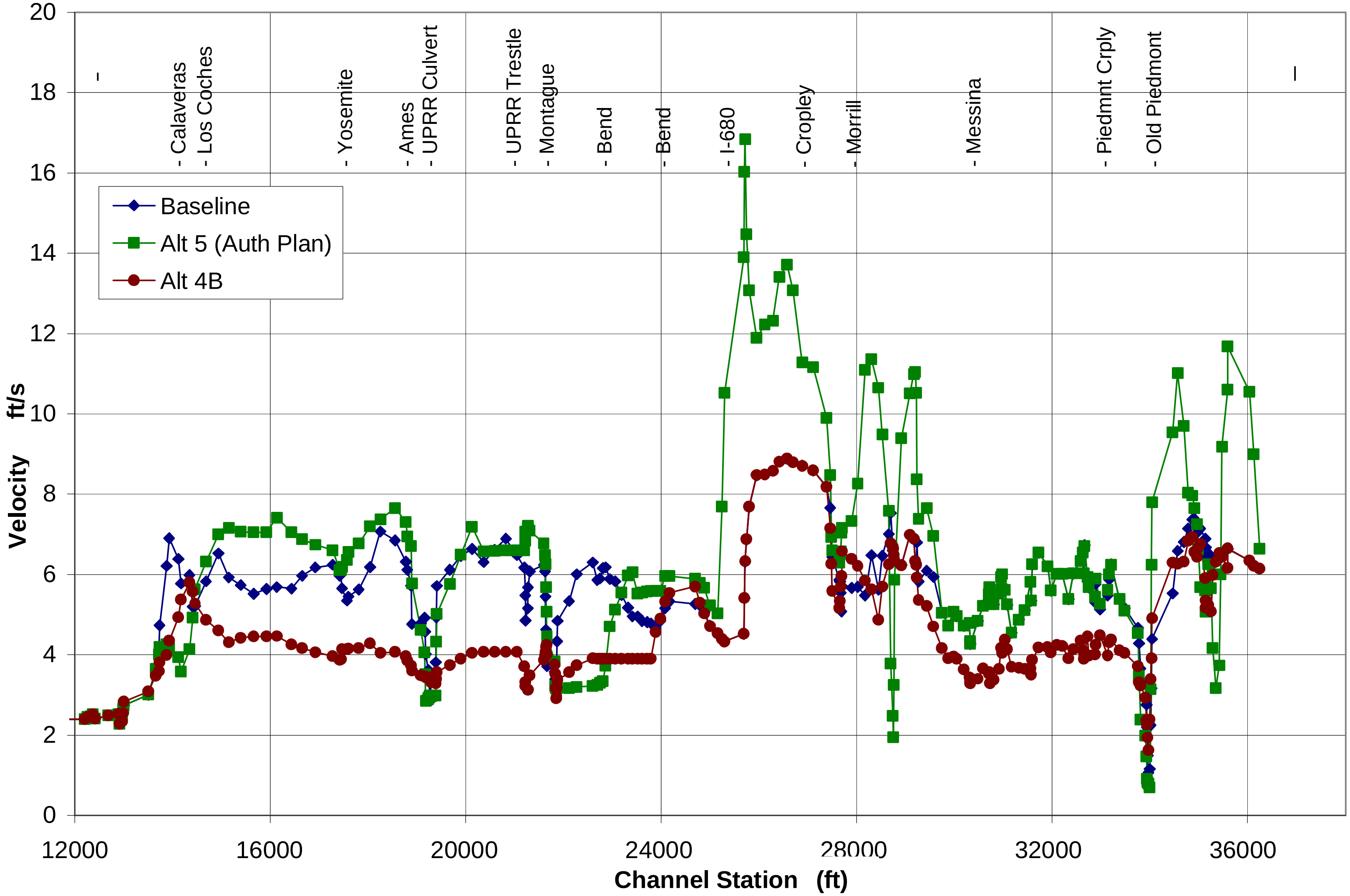

Figure 3-2 (Part 2 of 2) – Main Channel Velocity for Without- and With-Project Conditions, 50% Chance Exceedance Event

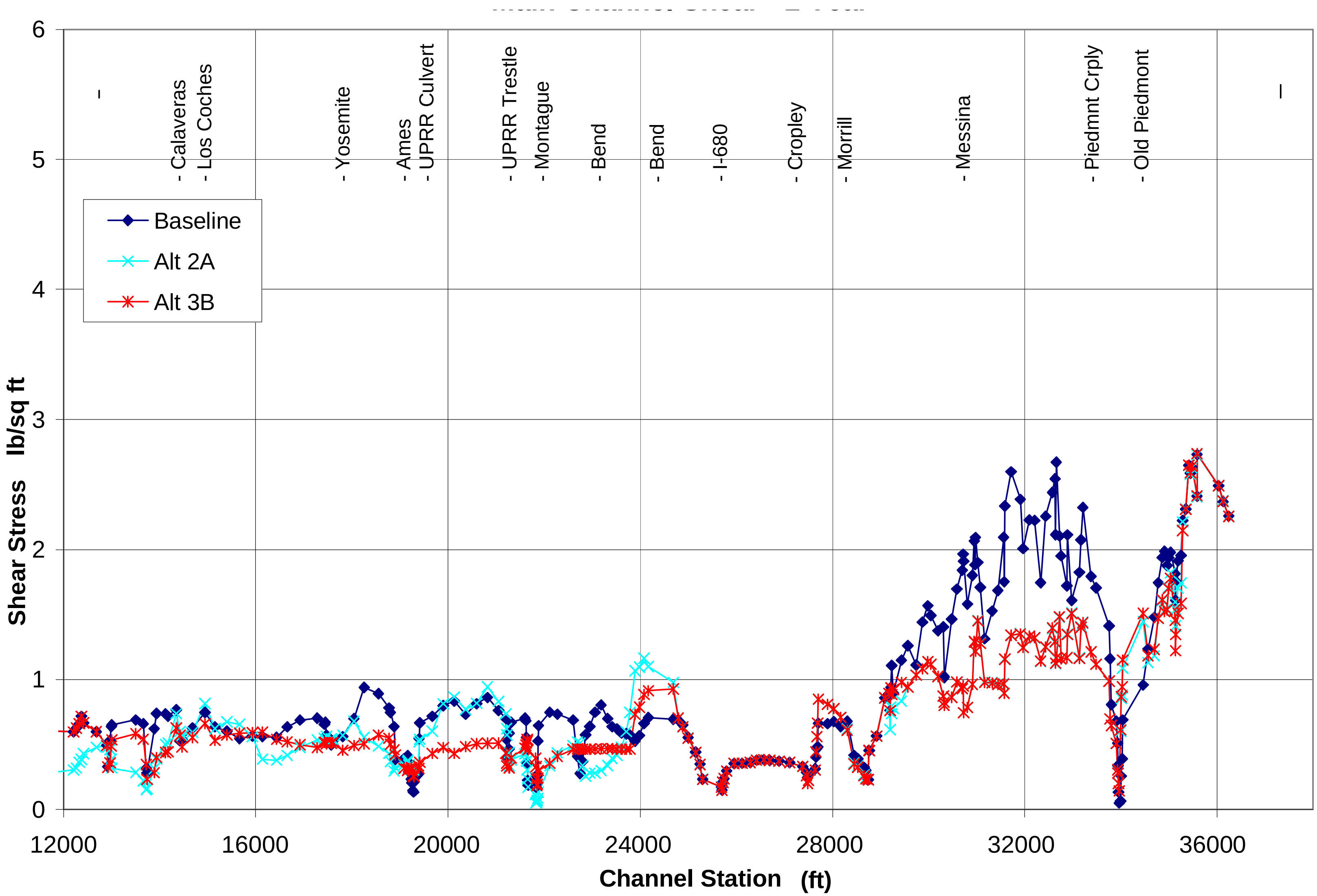

Figure 3-3 (Part 1 of 2) – Main Channel Shear Stress for Without- and With-Project Conditions, 50% Chance Exceedance Event

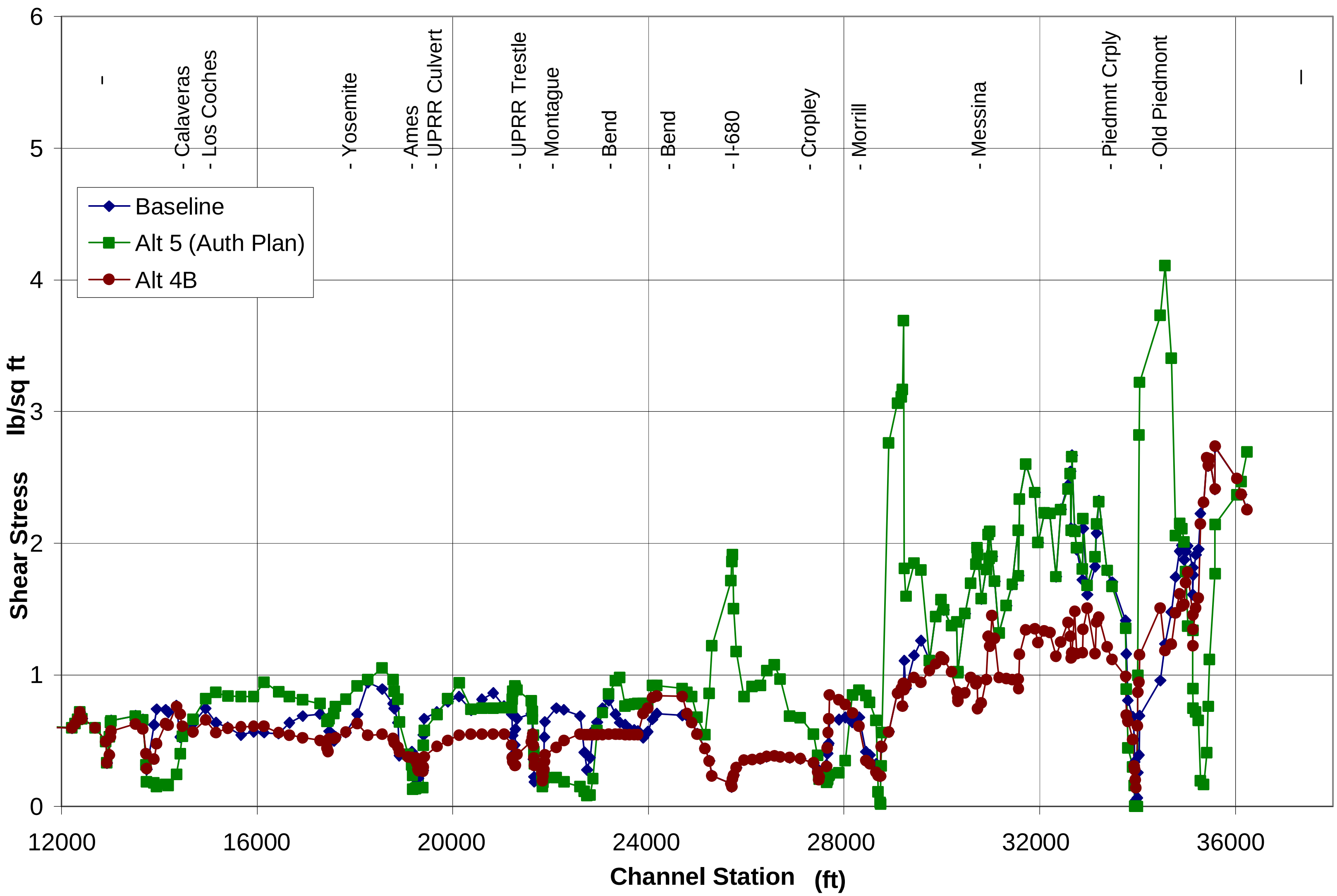

Figure 3-4 (Part 2 of 2) – Main Channel Shear Stress for Without- and With-Project Conditions, 50% Chance Exceedance Event

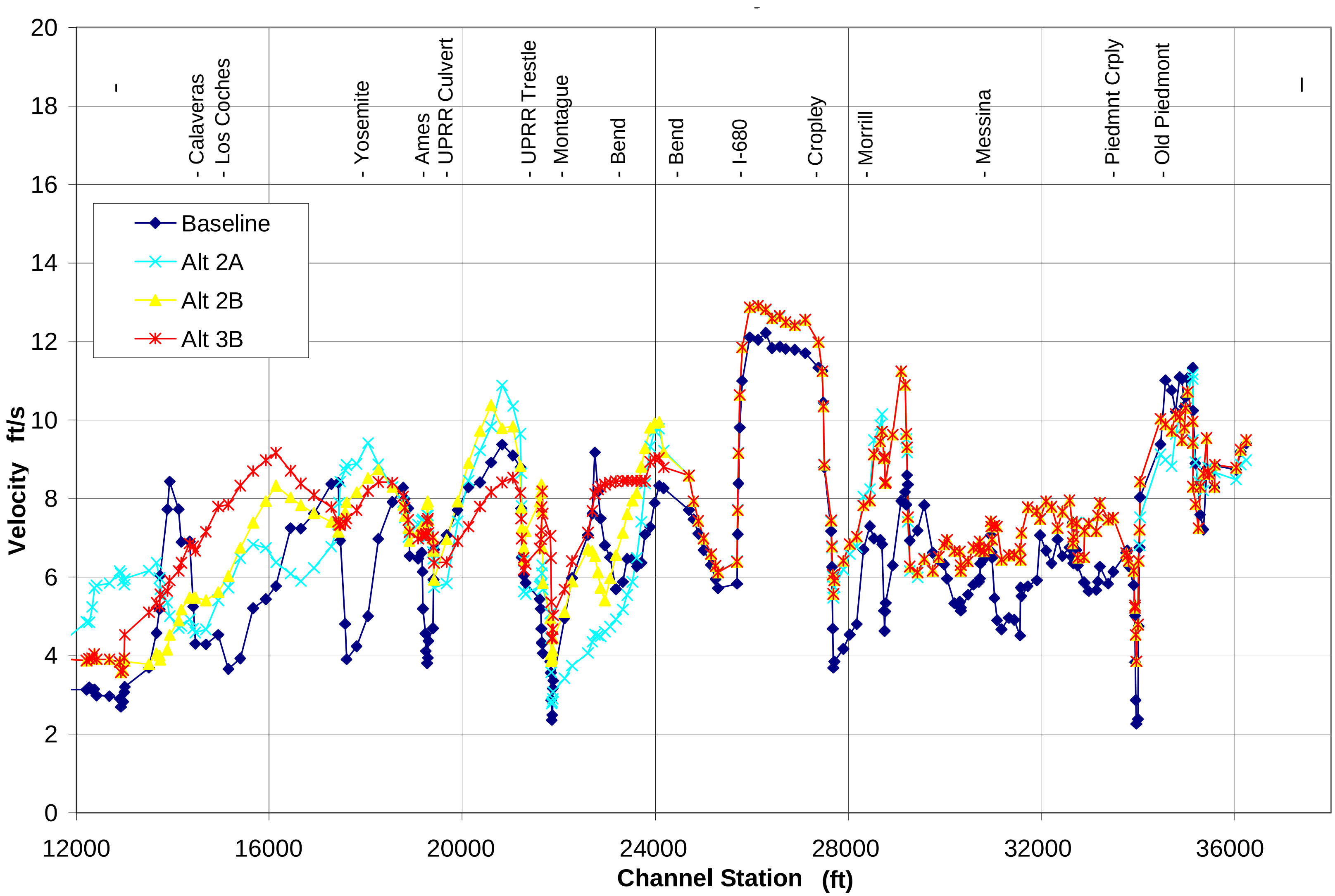

Figure 3-5 (Part 1 of 2) – Main Channel Velocity for Without- and With-Project Conditions, 1% Chance Exceedance Event

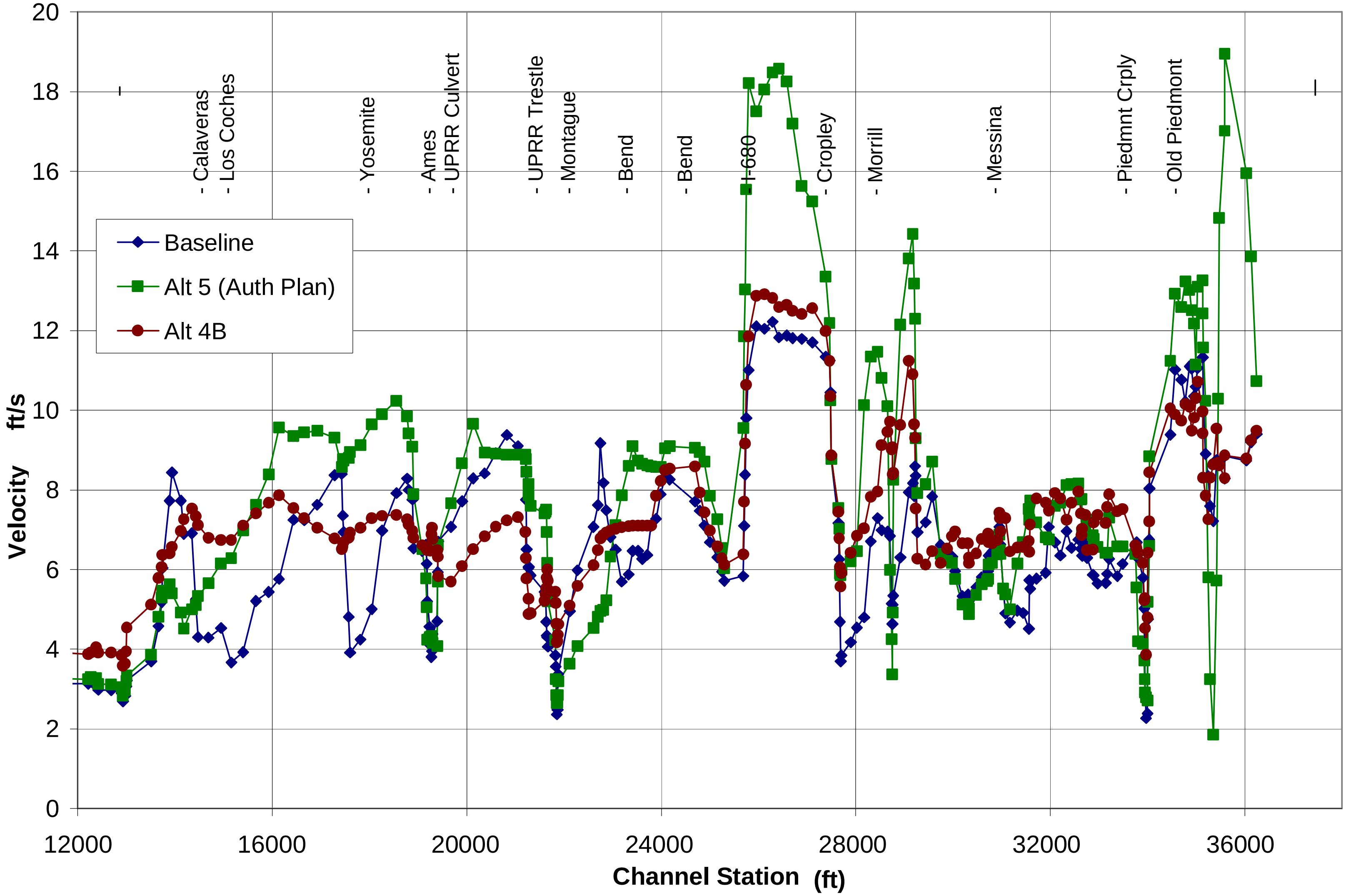

Figure 3-6 (Part 2 of 2) – Main Channel Velocity for Without- and With-Project Conditions, 1% Chance Exceedance Event

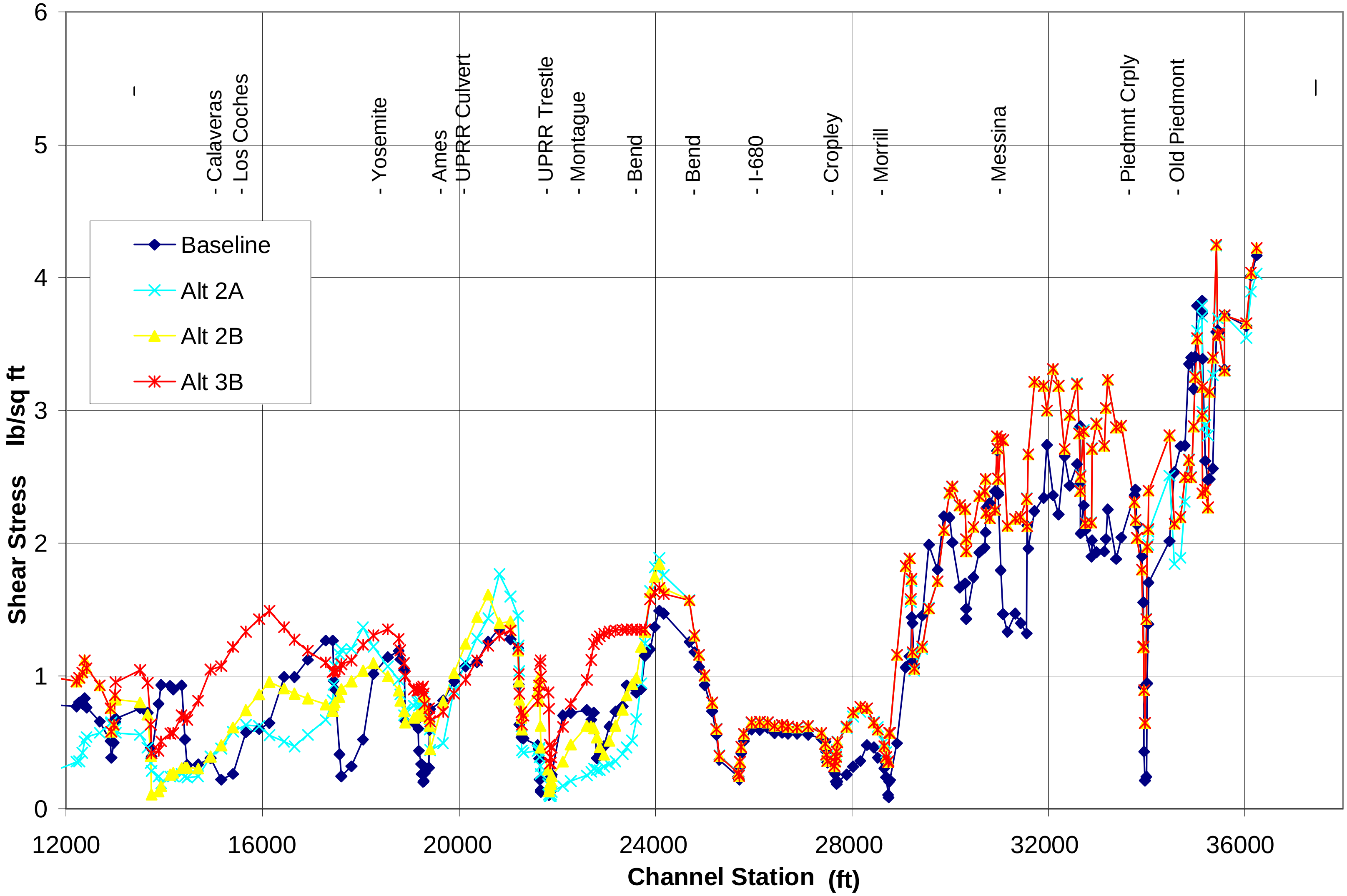

Figure 3-7 (Page 1 of 2) – Main Channel Shear Stress for Without- and With-Project Conditions, 1% Chance Exceedance Event

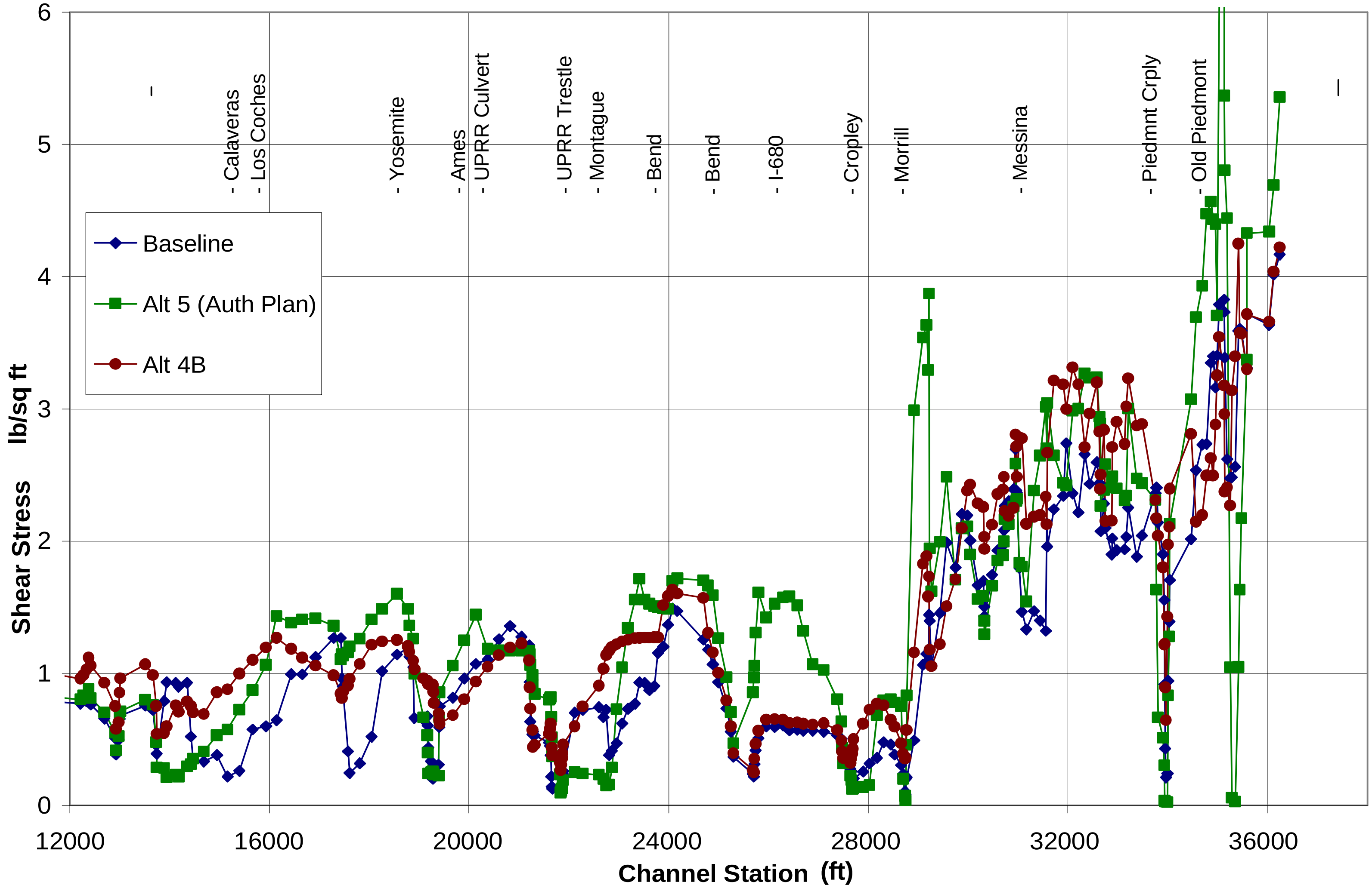

Figure 3-8 (Page 2 of 2) – Main Channel Shear Stress for Without- and With-Project Conditions, 1% Chance Exceedance Event

The values in both sets of plots are for the main channel since this is the portion of the flow that is responsible for nearly all the bed material load transport and it is the bed material load transport that determines the aggradation and degradation characteristics within the project area. Additionally, it is the sand and larger material that has been removed from the channel and sediment basin by past maintenance activities. The larger variation in shear stresses and velocities in the alternatives are related to the in-line detention basins, with backwater conditions behind and weir flow over the crest.

3.2.1.1 Comparison of 50% Chance Exceedance Event

The 50% chance exceedance event was used in the comparison because this event is considered to be approximately the channel forming flow, i.e. most representatives of typical conditions that determine the behavior of the channel over the long term.

Velocity

There is a general trend in reduction of the 50% chance exceedance event velocity for the with-project condition in the Calaveras Boulevard to Montague Expressway reach. Starting from the downstream end of the project, in the reach extending 500 feet upstream of Calaveras Boulevard, the velocities for all alternatives decrease by between 2 and 7 feet per second. The without-project velocity spikes at station 141+21 at 11 feet per second while the with-project velocities range from 3 to 7 feet per second. The largest decrease in this area is with Alternatives 2B and Alternative 5. For the rest of the distance up to Montague Expressway, the velocities for Alternatives 2A, 2B and 3B are similar to without-project condition, except where the velocity spikes (to almost 10 feet per second) downstream on the UPRR culvert; these higher values are eliminated for these with-project alternatives. A high velocity spike of nearly 9 feet per second is introduced in Alternative 2B immediately upstream of the UPRR culvert. The velocities for Alternative 4B are generally lower than the without-project condition in this reach, and the velocities for Alternative 5 are slightly higher than the without-project condition.

Upstream of I-680 to Morrill Avenue, the with-project conditions are extremely similar to the without for all alternatives except Alternative 5. Alternative 5 contains similar velocities to the without-project condition in some of this reach, but varies in particular in the vicinity of bridges due to differing conveyance capacity of the bridges and culverts in this alternative.

Upstream of Morrill Avenue to the upper extent of the Greenbelt area, the velocities of the without-project condition are generally higher than Alternative 2A, 2B, 3B and 4B, oscillating between roughly 3 and 8 feet per second. Many of the spikes are approximately 50 % higher than the values for these Alternatives (8 feet per second compared at 5 to 6 feet per second). Conversely, Alternative 5 has very similar velocities to the without-project condition in this reach, with the exception of two very high velocity spikes of 16 and 17 feet per second at stations 344+67 and 355+86 respectively.

Shear Stress

The comparison of shear stress for the 50% chance exceedance event show similar trends to the velocity comparison described previously. In the vicinity of Calaveras Boulevard, the shear stresses drop by 0.5 to 1 lbs/ft^2 for all with-project Alternatives. In the reach extending from Calaveras Boulevard up to I-680, shear stresses for all Alternatives are on average slightly lower than the without-project condition. Between I-680 and Morrill Avenue shear stresses of Alternatives 2A, 2B, 3B and 4B are identical to the with-project condition, typically 0.5 to 1 lbs/ft^2. From Morrill Avenue to the project upstream limit, shear stresses of the without-project condition oscillate considerably between 1 and 4 lbs/ft^2. Values for Alternatives 2A, 2B, 3B and 4B oscillate, generally between 1 and 2.5 lbs/ft^2. Alternative 5 differs significantly from the other with-project alternatives, due to the presence of in-line detention basins and the differing conveyance capacities of the bridges and culverts.

3.2.1.2 Comparison of 1% Chance Exceedance Event

The 1% chance exceedance event was used in the comparison because it is a large event that is typically utilized to represent the most severe conditions that the project is likely to experience during its design life. Though the 50% chance exceedance event indicates the general behavior of the project over a long period, the response during the 1% chance exceedance event can cause damages that can require significant maintenance or destroy project features.

Velocity

For the 1% chance exceedance event velocity, the velocity changes in the area of Calaveras Boulevard are more significant than for the 50% chance exceedance event. From 1,000 feet downstream to Calaveras Boulevard, they increase by about 1 foot per second for all with-project conditions, Alternative 2A showing a greater increase of up to 3 feet per second. At station 141+21, the without-project velocity spikes to 12 feet per second, whereas the velocities for the with-project alternatives are lower ranging from 5 and 8 feet per second. From upstream of Calaveras Boulevard to I-680, there is no clear trend between the with- and without-project conditions. Though the velocities are not the same, they all vary widely from about 4 feet per second to 12 feet per second, with similar averages through the reach but with significant differences at individual locations. Generally, velocities for the without-project condition spike and fall to a greater degree than for the with-project alternatives. Between the UPRR culvert and Trestle, Alternative 2A has two spikes over 12 feet per second, whereas Alternatives 2B, 3B, 4B and 5 are consistently between 8 to 10 feet per second. The baseline condition varies from 6 to 10 feet per second in this reach.

From Montague Expressway and upstream for 1,000 feet, the velocities drop by several feet per second for all alternatives, with Alternative 2A having the largest drop. The with-project conditions in this segment are the lowest in the entire project area, generally dropping to a maximum of 3 feet per second. Whereas the without-project condition has velocities of 3 to 4 feet per second only in the area of the Montague Expressway bridge, the with-project

conditions velocities remain in the 3 to 4 feet per second range for approximately 1,000 feet upstream. This is not desirable, since the area already experiences sediment deposition.

Further upstream between stations 260+00 and 300+00 the velocities for Alternatives 2A, 2B, 3B and 4B are extremely similar to the without-project condition. In the vicinity of the I-680 crossing, velocities under all project scenarios drop to 5 feet per second, but upstream of this the velocities in all cases increase to 12 to 13 feet per second. Alternative 5 shows much larger velocity spikes, over 20 feet per second, in this reach. Between Old Piedmont Road and I-680 to the upstream project limit, velocities oscillate to a greater degree for all Alternatives and the without-project condition, with values ranging between 5 and 10 feet per second. Again, Alternative 5 is the exception with spikes near to the project upstream limit of over 25 feet per second.

<u>Shear Stress</u>

The comparison of shear stress for the 1% chance exceedance event show similar trends to the velocity comparison. The with- and without-project conditions shear stresses overall for the 1% chance exceedance event indicate a drop of around 1 lbs/ft^2 for the with-project conditions. Overall the drop is least for Alt 3B and most substantial for Alt 2B. Alternative 2A has a high spike in shear stress at two locations between the UPRR culvert and trestle greater than 2 lbs/ft^2. Similar to velocity, there is a significant drop in shear stress in the vicinity and upstream of Montague Expressway. Values drop below 0.2 lbs/ft^2 for all alternatives. Between station 240+00 and 280+00 the shear stresses for all Alternatives except Alternative 5 are identical to the without-project condition. Between Old Piedmont Road and I-680, the with- and without-project shear stresses oscillate considerably between 1 and 6 lbs/ft^2. This is true mostly for Alternative 5, except for two large spikes of 11 and 17 lbs/ft^2.

3.2.2 Final Array of Alternatives

As described in Section 2.2 and Chapter 5 of *Part I: Hydraulic Analysis of Alternatives* of this engineering appendix, unsteady HEC-RAS models were developed as part of this study to model the without-project and final array of project alternatives. To assess potential changes in sediment transport conditions within the project area, velocity and shear stress values from the revised GRR methodology (see Section 2.2 of *Part I: Hydraulic Analysis of Alternatives* of this engineering appendix) HEC-RAS models were compared from reach to reach along the channel. During the analysis of the preliminary array of alternatives it was found that the portion of the project between Old Piedmont Road and I-680 was not justified and those portions of the project were removed from the final alternatives. Therefore, the following figures show only the downstream of I-680 results. The trends apparent in the plots were reviewed for without-project and with-project alternatives. The velocity plots are presented along the project station line in Figure 3-9 and Figure 3-11 for the 50% and 1% chance exceedance events, respectively. Similar plots are provided in Figure 3-10 and Figure 3-12 for shear stress. Results have been smoothed with running average values over two cross sections upstream and downstream of each station. Sections 2.2.2 and 5.4 of *Part I: Hydraulic Analysis of Alternatives* of this engineering appendix contains more comprehensive results for the revised GRR methodology without-project and final array of alternatives.

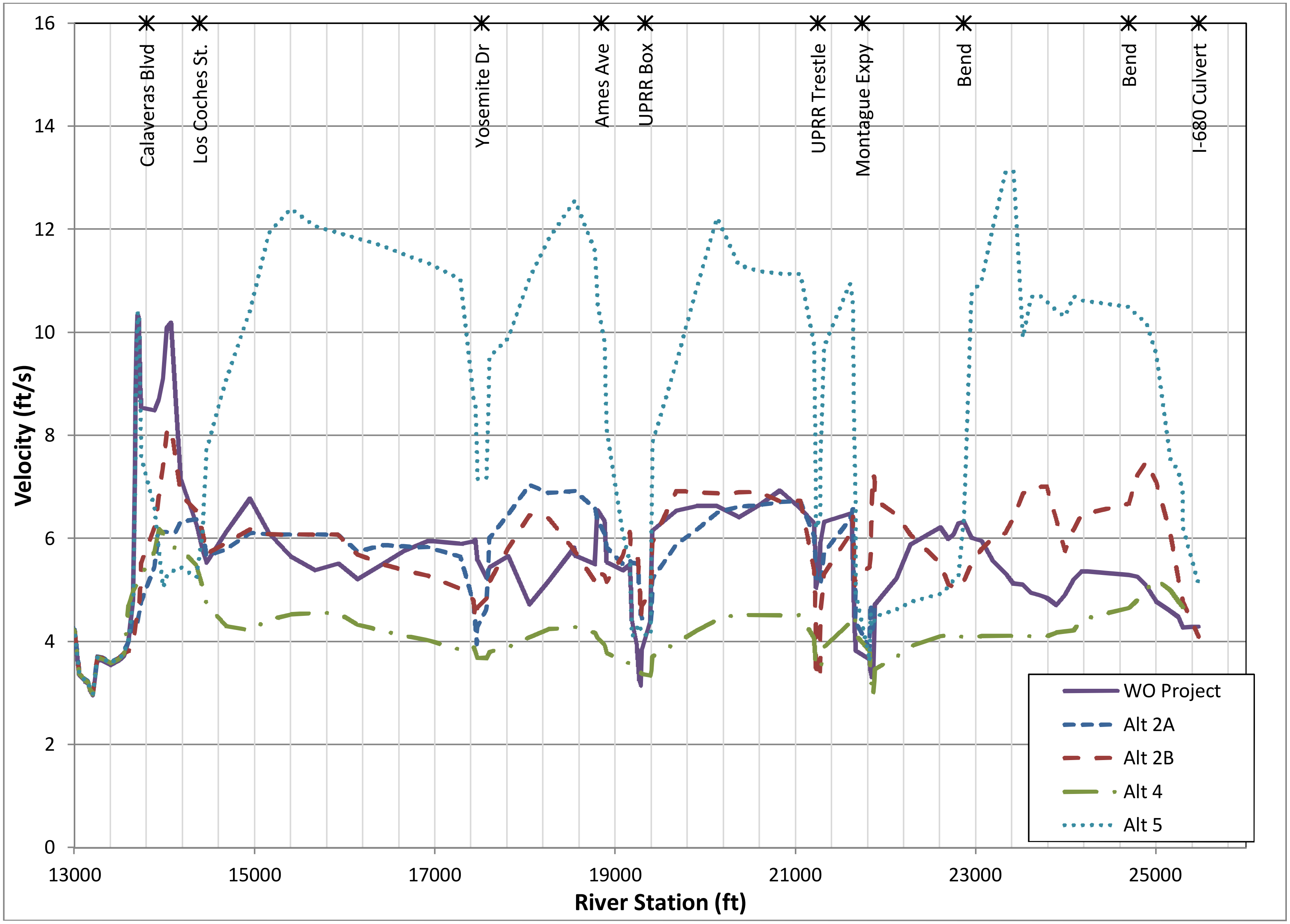

Figure 3-9 Main Channel Velocity Comparison of Without- and With-Project Conditions, 50% chance exceedance Event

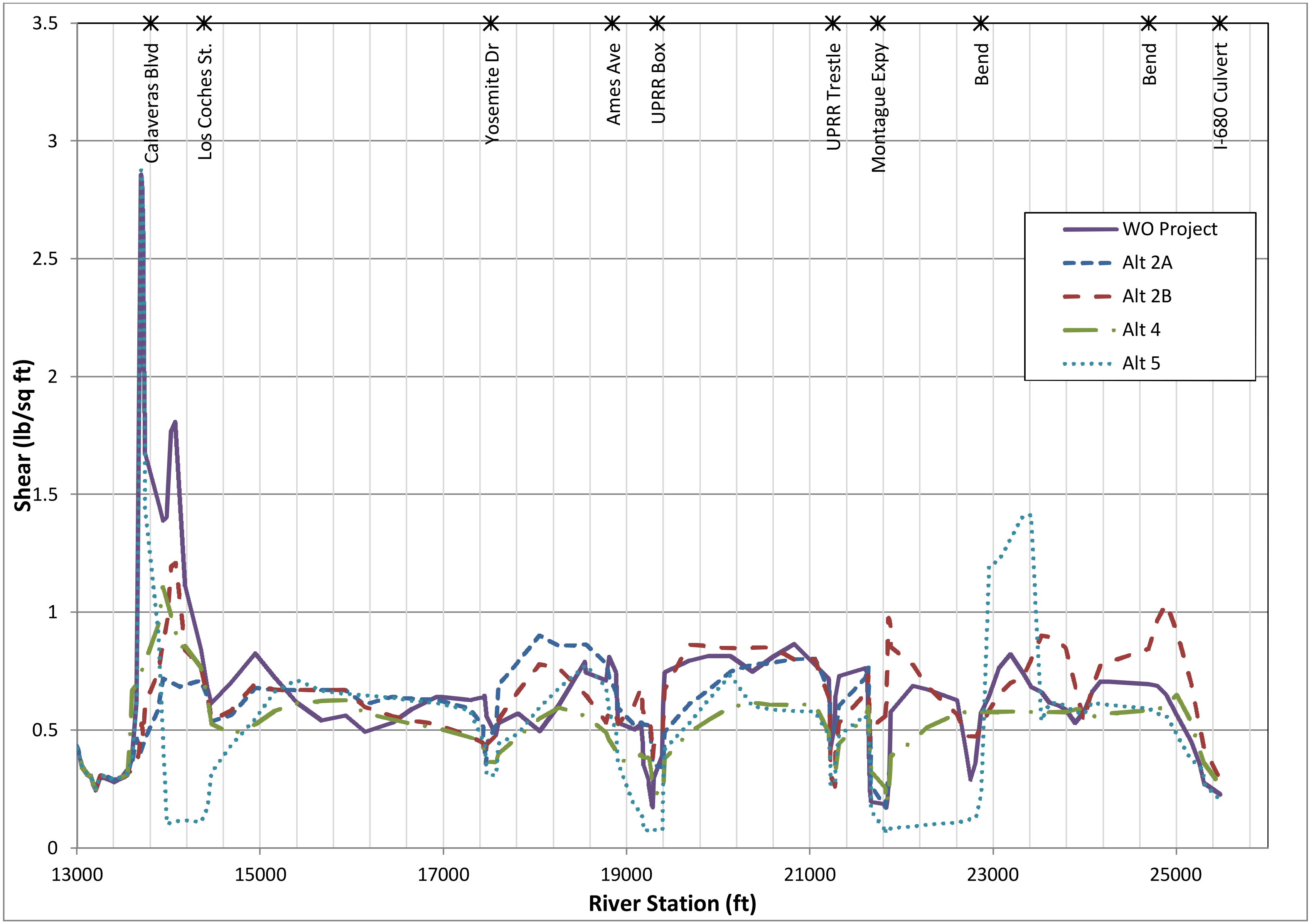

Figure 3-10 Main Channel Shear Stress Comparison of Without- and With-Project Conditions, 50% chance exceedance Event

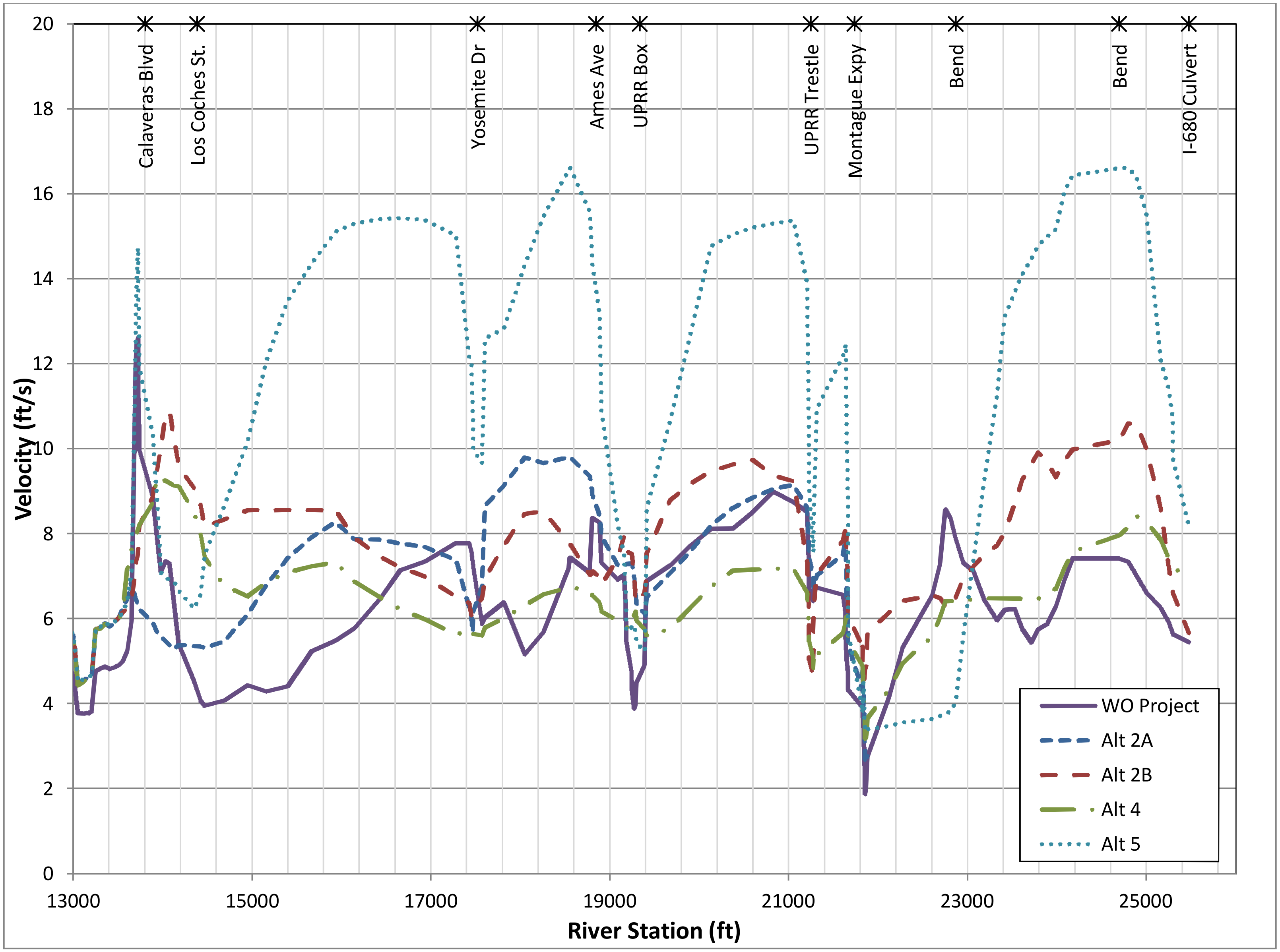

Figure 3-11 Main Channel Velocity Comparison of Without- and With-Project Conditions, 1% chance exceedance Event

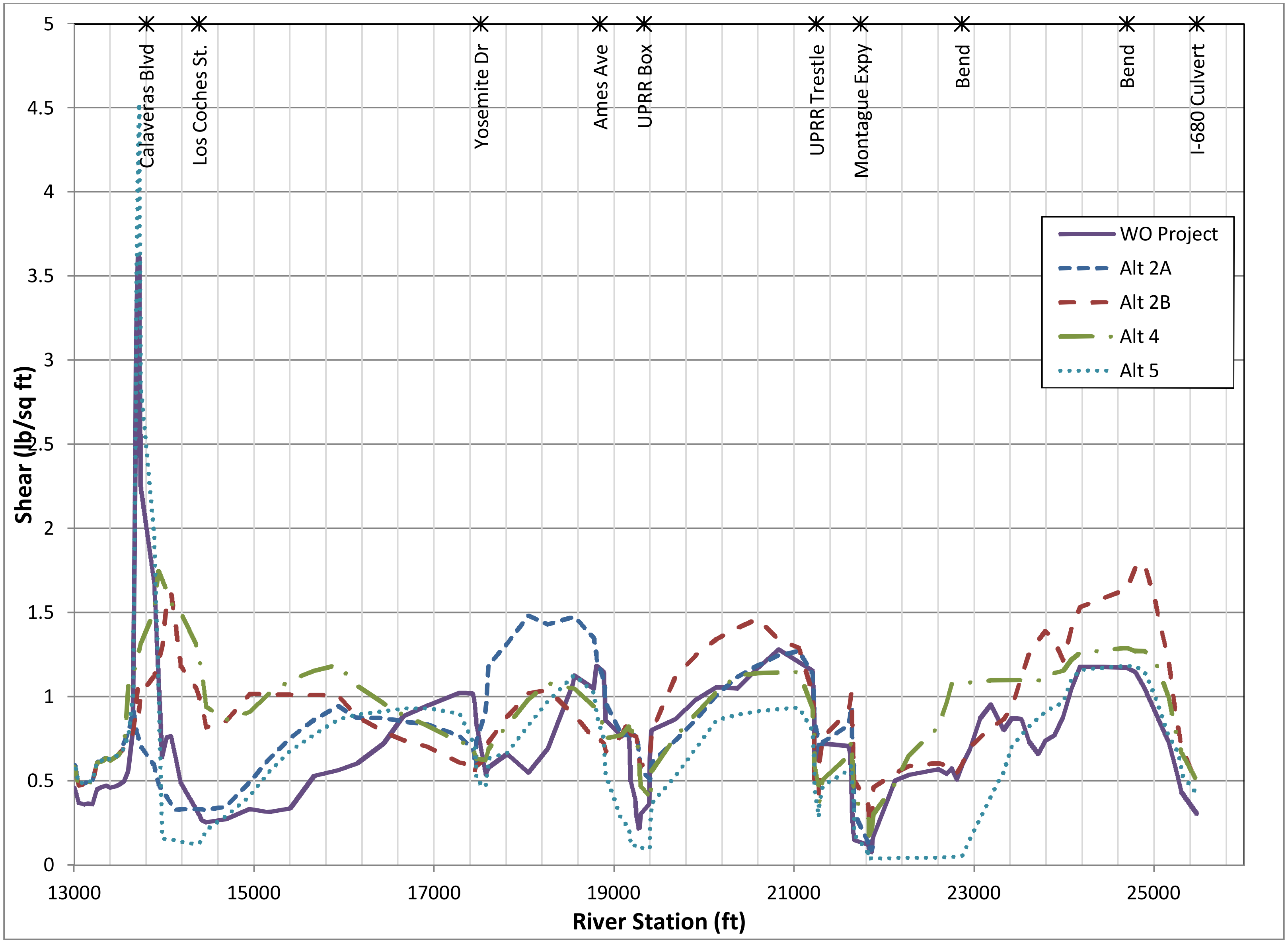

Figure 3-12 Main Channel Shear Stress Comparison of Without- and With-Project Conditions, 1% chance exceedance Event

The values in both sets of plots are for the main channel since this is the portion of the flow that is responsible for nearly all the bed material load transport and it is the bed material load transport that determines the aggradation and degradation characteristics within the Greenbelt and the project area. Additionally, it is the sand and larger material that has been removed from the channel and sediment basin by past maintenance activities.

3.2.2.1 Comparison of 50% Chance Exceedance Event

The 50% chance exceedance event was used in the comparison because this event is considered to be approximately the channel forming flow, i.e., the most representative of typical conditions that determine the behavior of the channel over the long-term.

The general trend in velocity is for Alternatives 2A/d and 2A/b is to approximately follow the without-project velocities with minor reductions in velocities upstream of Montague. Alterative 4/d shows a general reduction of the 50% chance exceedance velocity for the with-project condition relative to the without-project. The decrease is generally on the order of 0.5 up to 2.0 feet per second. In some isolated areas for Alternative 2A/d, 2B/d, and 4/d, particularly where the modification of bridges removed backwater effects, velocities show an increase. Alternative 5 shows a large increase in velocity over the without-project based on the concrete lined channel proposed. The highest running average velocity exhibited under with-project conditions is approximately 7.5 feet per second in Alternative 2B/d.

A comparison of shear stresses for the 50% chance exceedance event shows similar trends to the velocity, with shear stresses for Alternatives 2A/d, 2B/d, and 4/d on average equal to or slightly lower than the without-project condition. In a few areas, specifically above Montague Blvd and downstream of Yosemite Ave., the alternative shear stress is higher than the without project conditions. Shear stress for Alternative 5 is generally lower than the without-project conditions with the exception of two locations, one upstream of Montague Blvd. and one downstream of Yosemite Ave., that are higher than the without project condition.

3.2.2.2 Comparison of 1% Chance Exceedance Event

The 1% chance exceedance event was used in the comparison because it is a large event that is typically utilized to represent the most severe conditions that the project is likely to experience during its design life. Though the 50% chance exceedance event indicates the general behavior of the project over a long period, the response during the 1% chance exceedance event can cause damages that can require significant maintenance or destroy project features. Under existing conditions, the 1% chance exceedance discharge breaks out of the channel in several locations. The with-project alternatives contain a larger discharge and result in velocity and shear stress increases downstream of breakout locations. The increases in velocity are most pronounced in the reaches where the right-of-way is constrained. The maximum running average velocities exhibited under with-project conditions are approximately 16.5 feet per second in Alternative 5.

A comparison of shear stresses for the 1% chance exceedance event shows similar trends to the velocity comparison. The maximum running average shear stress under with-project conditions is approximately 1.8 lbs/sq ft for both Alternatives 2B/d and 4/d.

3.3 Quantitative Sediment Transport Analysis of the Final Array of Alternatives

A quantitative sediment transport analysis was conducted for the final array of alternatives. The purpose of the analysis was to develop an estimate of the potential O&M sediment removal quantities for the Final Array of Alternatives assuming existing conditions between Old Piedmont Road and I-680. In addition, an analysis was conducted assuming the SCVWD Bypass Alternative was in place between Old Piedmont Road and I-680 for Alternatives 2B/d and 4/d.

3.3.1 Methodology

This section presents the methodology used to conduct the sediment transport analysis. Due to differing levels of information being available between Old Piedmont Road and I-680 for the existing conditions and SCVWD Bypass alternatives, different methodologies were used for each analysis.

3.3.1.1 Existing Conditions between Old Piedmont Road and I-680 Methodology

A spreadsheet analysis of the sediment transport capacity through the study area was conducted to determine the potential O&M requirements for the final array of alternatives. The study area was divided into four reaches based on the reaches used to report sediment removal maintenance provided by SCVWD (as discussed in Section 3.1.4). Additionally, *Upstream of the Piedmont-Cropley Culvert* and the *Greenbelt between the Piedmont-Cropley Culvert and Morrill Avenue* were added as supply reaches, since these reaches are a source of sediment supply to the downstream reaches. The transport reaches used are listed in Table 3-1.

Table 3-1 Analysis Reaches

Reach	Reach Type
Upstream of the Piedmont-Cropley Culvert	Supply
Greenbelt between Piedmont-Cropley Culvert and Morrill Ave	Supply
Morrill Ave to I-680	Transport
I-680 to Montague Expressway	Transport
Montague Express to Calaveras Blvd	Transport
Downstream of Calaveras Blvd	Transport

The Yang sediment transport equation was used to estimate the sediment transport through each reach. The Yang sediment transport equation was chosen based on the research conducted by Brett Jordan on Berryessa Creek for his dissertation in 2009 (Jordan, 2009). Jordan concluded that the Yang equation best represented Berryessa Creek based on an analysis of potential sediment transport equations. The Yang equation has two variations based on whether the transport of sand and gravel is being estimated. The Yang equation estimates the sediment transport rate based on a representative diameter and reach-averaged hydraulics.

Sediment gradation curves were obtained from sediment sampling conducted for the Northwest Hydraulic Consultants' *Upper Berryessa Creek Existing Conditions Sediment Transport Assessment* (NHC, 2003). A number of samples were collected along each reach during different times of the year. For the purposes of this analysis samples taken during the winter season were used since the high flows in Berryessa Creek occur primarily during the winter rainy season. For the purpose of this analysis, the sediment gradation curves were divided into ten sediment size classes with a representative diameter assigned to each. The size fraction of each sediment size class was determined for each reach. Table 3-2 lists the minimum, maximum, and representative diameters for each of the sediment sizes classes used. Table 3-3 lists the fraction of the total for each sediment size class for each reach.

Table 3-2 Sediment Size Classes

Grain Size Interval	Min Diameter	Max Diameter	Representative Diameter
Fine/Very Fine Sand	0	0.25	0.125
Medium Sand	0.25	0.5	0.35
Course Sand	0.5	1	0.71
Very Coarse Sand	1	2	1.4
Very Fine Gravel	2	4	2.8
Fine Gravel	4	8	5.7
Medium Gravel	8	16	11.3
Course Gravel	16	32	22.6
Very Course Gravel	32	64	45.8
Small Cobble	64	128	91.6
Total			

Table 3-3 Sediment Class Size Distribution by Reach

Grain Size Interval	Sediment Class Size Distribution					
	Upstream of the Piedmont-Cropley Culvert	Greenbelt from Piedmont-Cropley Culvert to Morrill Ave	Morrill Ave to I-680	I-680 to Montague Expressway	Montague Express to Calaveras Blvd	Downstream of Calaveras Blvd
Fine/Very Fine Sand	6%	5%	6%	4%	3%	4%
Medium Sand	6%	6%	7%	7%	6%	10%
Course Sand	4%	5%	6%	7%	6%	10%
Very Coarse Sand	7%	7%	9%	14%	14%	13%
Very Fine Gravel	7%	12%	13%	18%	16%	15%
Fine Gravel	10%	17%	17%	16%	20%	18%
Medium Gravel	12%	20%	17%	19%	22%	18%
Course Gravel	21%	18%	16%	11%	11%	9%
Very Course Gravel	8%	6%	7%	4%	2%	3%
Small Cobble	19%	4%	2%	0%	0%	0%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

The average hydraulics for the 50% to 0.2% chance exceedance events were developed for each reach using the results of the FLO-2D and HEC-RAS modeling discussed in *Part I: Hydraulic Analysis of Alternatives* and *Part II: Floodplain Development of Alternatives*. Since the bulk of the average annual sediment transport is conveyed proportionally by smaller, more frequent events, a 67% chance exceedance event was developed. The 67% chance exceedance event was developed by plotting the inflows to the FLO-2D and HEC-RAS models and estimating the 67% chance exceedance event inflows. The ratio of the 67% to the 50% chance exceedance inflows was then computed and applied to the FLO-2D and HEC-RAS 50% chance exceedance inflows used to develop the hydraulics for the 67% chance exceedance event.

The reach-averaged hydraulics were used in conjunction with the sediment size class data to calculate the sediment transport for each sediment size class for each event. The total sediment transport rates for each event were developed by combining the calculated transport rates for each sediment class size based on based on the fraction of the total sediment gradation each class represented. Finally, the sediment transport rates for each event were probability-weighted to develop the average annual sediment transport rate for each reach.

The potential deposition in each reach was determined by subtracting the sediment transport through the reach from the transport rate of the reach upstream. A positive result indicated a reduction in the sediment transport capacity through the reach resulting in deposition. A negative result indicated an increase in sediment transport capacity through the reach resulting in pass-through conditions and potential erosion in unarmored section of channel.

Deposition in the sediment basin below the Piedmont-Cropley culvert was developed assuming that 100% of the gravels from the upstream reach were captured in the sediment basin. The amount of sand captured in the sediment basin was calculated based on the assumption that captured sediment matrix was composed of 75% gravel and 25% sand, with the sand filling voids in the gravel.

The initial without-project alternative results were compared to the average annual sediment removal based on maintenance records (see Section 3.1.4) to determine how well the spreadsheet analysis reflected observed deposition trends. As seen in Table 3-4, the initial results did not reflect the observed trend well. To better model the observed deposition calibration coefficients were applied to the sediment transport equations for each of the reaches to better match the observed deposition trends. As seen in Table 3-4 the application of calibration coefficients ranging from 0.98 to 5.31 produced results that matched the observed deposition. The remaining alternatives were analyzed by using the calibrated spreadsheet model and the alternative hydraulics.

Table 3-4 Model Calibration Results

Reach	Average Annual Sediment Deposition (cy)			Calibration Coefficient
	SCVWD Maintenance Records	Initial Results	Calibrated Results	
Upstream Old Piedmont to Piedmont-Cropley Sediment Basin[1]	537	2281	537	0.2355
Piedmont-Cropley Culvert to Morrill Ave (Greenbelt)	0	0	0	2.38
Morrill Ave to I-680	510	-1417	510	0.999
I-680 to Montague Expressway	418	2230	418	4.113
Montague Express to Calaveras Blvd	199	12	199	3.85
Downstream of Calaveras Blvd	5521	557	2180	1

[1]The average annual sediment deposition for this reach is based on the sediment captured in the sediment basin only with no deposition in the reach upstream of the sediment basin.

It should be noted that this methodology was developed based on the limited available hydraulic information. The use of average hydraulics and peaks flows to determine sediment concentrations through reaches represent one point on the sediment rating curve. This approach tends to overestimate the total sediment transport when applied to the entire flow volume from the storm event. A much more intensive modeling approach, beyond the scope of this study, would be required to truly develop the transport based on the sediment transport over the entire range of a storm event. Calibrating the equations to observed deposition trends largely accounts for this effect, thought the results will still be conservative. Therefore,

the methodology presented above satisfies the intent to estimate the change in the sediment deposition through the study area.

3.3.1.2 SCVWD Bypass Alternative between Old Piedmont Road and I-680 Methodology

The local sponsor (SCVWD) has proposed a future project between Old Piedmont Road and I-680 consisting of a bypass culvert diverting most of the flood flows around the Greenbelt reach to help alleviate flooding in the Greenbelt reach. The proposed bypass would divert most of the flood flow from Berryessa Creek just upstream of the Piedmont-Cropley culvert, convey the flow down a culvert under Cropley Avenue, and finally discharge the flow at a point near the Cropley Avenue Bridge. The SCVWD bypass alternative is discussed in more detail in Section 5.2.3 in *Part I: Hydraulic Analysis of Alternatives*. The impacts to the sediment maintenance requirements for alternatives 2B/d and Alt 4d were analyzed.

To evaluate the impacts of the SCVWD bypass, the *existing conditions between Old Piedmont Road and I-680* spreadsheet model required modification as detailed hydraulics were not available for the SCVWD bypass alternative. The bypass alters the potential amount of sediment supply from the Greenbelt as well as transporting sediment through the bypass culvert. The transport through the Greenbelt was approximated using the bypass diversion rating curve, the Berryessa Creek flows at the downstream of the Greenbelt, and the existing conditions between Old Piedmont Road and I-680 sediment rating curve for the Greenbelt reach. First the Berryessa Creek peak flows for the *existing conditions between Old Piedmont Road and I-680* at the downstream end of the Greenbelt were determined from the without-project HEC-HMS hydrologic modeling. Then the Berryessa Creek peak flow for the *SCVWD bypass alternatives between Old Piedmont Road and I-680* was developed using the SCVWD bypass HEC-HMS model. A sediment rating curve for the Greenbelt reach was developed using the *existing conditions between Old Piedmont Road and I-680* flows and the calculated sediment transport for each flow event. The sediment rating curve was then used to approximate the sediment transport rate through the greenbelt supply reach based on the Berryessa Creek *with SCVWD bypass alternatives between Old Piedmont Road and I-680* flows at the downstream end of the Greenbelt. .

In addition to altering the sediment transport rate in the greenbelt reach, the SCVWD bypass would also alter the deposition in the sediment basin below the Piedmont-Cropley culvert. To determine the deposition in the sediment basin, the sediment transport through the Piedmont-Cropley culvert was determined for the gravel fraction. A sediment rating curve based on the flow at the culvert for the existing conditions was developed for gravels. The flow through the culvert with the SCVWD bypass in place was then used to approximate the gravel transport through the culvert with the bypass. As for the *existing conditions between Old Piedmont Road and I-680* methodology, it was assumed that 100% of the gravel transported through the culvert would be captured in the basin and that the captured sediment matrix would consist of 75% gravel and 25% sands. Since the invert of the bypass culvert is one foot above the invert of the Piedmont–Cropley culvert, the gravel bed load is prevented from being conveyed through the bypass culvert. Therefore, the remaining portion of the gravel supply from upstream of the bypass will deposit in the reach. Since no detailed hydraulic results were available for the SCVWD bypass alternative, the location of deposition of this material cannot be determined. The remainder of the sand supply was assumed to be

conveyed through the bypass culvert and was added to the sediment supply estimate calculate for the Greenbelt reach.

The deposition estimates for the remaining reaches was then developed using the same procedures as the existing conditions *between Old Piedmont Road and* I-680 methodology. The average hydraulics for the study reaches were developed with the HEC-RAS models run with inflows reflecting the SCVWD bypass in place between Old Piedmont Road and I-680.

3.3.2 Results

The quantitative sediment analysis was conducted for the without-project, alternative 2A/d, 2B/d, and 4/d using hydraulic models developed for previous phases of this study for existing conditions between Old Piedmont Road and I-680. In addition, analyses were conducted for alternatives 2B/d and 4/d assuming the proposed SCVWD bypass alternative was in place between Old Piedmont Road and I-680. The potential deposition for each alternative was developed for each reach.

Table 3-5 lists the estimated average annual sediment transport rates and deposition for the without-project, Alternative 2A/d, 2B/d, and 4/d models using existing conditions between Old Piedmont Road and I-680. As seen in the table, for Alternatives 2A/d and 2B/d there is an increase in sediment transport through the I-680 to Montague and Montague to Calaveras. The increased transport results in a decrease in deposition in the I-680 to Montague reach for alternatives. With a larger amount of sediment being transported through the upstream reach, there in an increase in the amount of deposition in the Montague to Calaveras Boulevard reach for all alternatives over the without-project alternative. Overall, the total amount of sediment deposited in study area for Alternatives 2A/d and 2B/d is nearly equal to that under without-project conditions. For Alternative 4/d there is a marked increase in deposition in the study.

Table 3-5 Average Annual Sediment Transport and Deposition using Existing Conditions between Old Piedmont Road and I-680

Alternative	Reach						
	US of Old Piedmont Rd to Piedmont Cropley Culvert	Piedmont Cropley Sediment Basin	Piedmont-Cropley Culvert to Morrill Ave (Greenbelt)	Morrill Ave to I-680	I-680 to Montague Expressway	Montague Expressway to Calaveras Blvd	DS of Calaveras Blvd
Average Annual Sediment Transport Rate (cy)							
Without-Project	537	0	3318	2809	2391	2192	12
Alt 2A/d	537	0	3318	2809	3166	2161	10
Alt 2B/d	537	0	3318	2809	3836	2202	9
Alt 4/d	537	0	3318	2809	2208	1501	14
Average Annual Deposition (cy)							
Without-Project[1]	-na-	537	-na-	509	418	199	2180
Alt 2A/d	-na-	537	-na-	509	0	648	2151
Alt 2B/d	-na-	537	-na-	509	0	607	2192
Alt 4/d	-na-	537	-na-	509	601	707	1487

-na- not applicable as no deposition was modeled in these reaches since they act as supply reaches to the reaches below them and no deposition was reported in the SCVWD maintenance records.
[1]The without-project deposition values were calibrated to SCVWD sediment removal maintenance records.

Table 3-6 lists the average annual sediment transport rates and deposition results for Alternatives 2B/d and 4/d with the SCVWD Bypass between Old Piedmont Road and I-680. The without-project for existing conditions between Old Piedmont Road and I-680 alternative was included in the table for comparison purposes. As seen in the table there is a significant reduction in the deposition in the sediment basin below the Piedmont-Cropley culvert over existing conditions. This is due to a majority of flood flows being transported through the bypass culvert. The reduction in the flood flows to the Greenbelt reach results in a significant reduction in the sediment supply to the downstream reach. The sediment supply conveyed through the bypass culvert adds to the supply to the downstream reach, but accounts for only a small portion of the reduced Greenbelt sediment supply. As seen in the table, the sediment transport rate for the Morrill to I-680 reach is greater than the combined sediment supply for the Greenbelt and Bypass culvert. Since the sediment transport capacity through the reach is greater than the incoming supply, no deposition is seen in the reach. For both alternatives there is an increase in sediment transport through the I-680 to Montague and Montague to Calaveras reaches over the without-project alternative. The increased transport results in no deposition in the I-680 to Montague reach. Normally, a larger amount of sediment being transported through the upstream reach would result in an increase in the amount of deposition in the Montague to Calaveras Boulevard reach. But since the supply from the Greenbelt reach is limited, the transport capacity of Alternative 2B/d can transport the entire supply to the downstream reach with no deposition and Alternative 4/d showing a small amount of deposition.

Table 3-6 Average Annual Sediment Transport and Deposition for the SCVED Bypass between Old Piedmont Road and I-680

Alternative	Reach								
	US of Old Piedmont Rd to Piedmont Cropley Culvert	Piedmont Cropley Sediment Basin	Bypass Culvert	Piedmont-Cropley Culvert to Morrill Ave (Greenbelt)	Total Sediment Supply entering the Morrill Ave to I-680 Reach[1]	Morrill Ave to I-680	I-680 to Montague Expressway	Montague Expressway to Calaveras Blvd	DS of Calaveras Blvd
Average Annual Sediment Transport Rate (cy)									
Without-Project for existing conditions between Old Piedmont Road and I-680[2]	537	0	-	2219	2219	1709	1292	1092	38
Alt 2B/d with Bypass	537	0	88	1631	1718	2809	3774	2263	9
Alt 4/d with Bypass	537	0	88	1631	1718	2809	2283	1630	16
Average Annual Deposition (cy)									
Without-Project for existing conditions between Old Piedmont Road and I-680[2]	-na-	537	-	-na-	-na-	509	417	200	1057
Alt 2B/d with Bypass	-na-	450	-na-	-na-	-na-	0[3]	0[3]	0[3]	1709
Alt 4/d with Bypass	-na-	450	-na-	-na-	-na-	0[3]	0[3]	89	1702

1. The sediment supply to Morrill Avenue to I-680 reach is a combination of the transport from the Bypass Culvert and the Greenbelt reaches.
2. The without-project for existing conditions between Old Piedmont Road and I-680 alternative is included for comparison purposes.
3. Since the total supply from the Greenbelt to the reach is less than the transport through the reach zero deposition was recorded and potential erosion was not considered in this analysis.

-na- not applicable: no deposition was modeled in these reaches since they act as supply reaches to the reaches below them and no deposition was reported in the SCVWD maintenance records.

3.4 Conclusions

Several significant conclusions can be drawn from the comparisons of velocities and shear stress between the with- and without-project conditions in reference to the influence of the current alternatives on sediment transport conditions.

Throughout the project area, there are large variations in velocities and shear stresses that can cause localized sedimentation and scour problems. The project design needs to be further refined to reduce the level of these changes. Additionally, the measures used to provide passage of the design event through bridges should be reviewed. In cases in which walls were extended above the bridge deck to contain flows, there may be the creation of significant backwater conditions. The reduced velocity and shear stress may cause an additional potential for additional, localized deposition in an area that in some cases already experiences deposition.

Currently, the project area is a deposition zone and a reduction in velocity will further increase deposition and the need for maintenance. Constructed features should facilitate removal of deposited sediments.

Five sediment basin configurations have been previously evaluated upstream of the project area in order to reduce the downstream maintenance needs. The basin configurations are shown in Table 3-7. The schematic locations are shown in plan view and profile view in Figure 3-13 and Figure 3-14, respectively.

Table 3-7 Summary of Sediment Basin Location Alternatives

Alternative	Name	Description
A	F4A	F4A design concept. Existing basin bed lowered approximately 5 feet with 700-foot length excavated channel at basin outlet.
B	Reduced F4A	F4A design concept with reduced basin lowering (approximately 2.5 feet) and excavated channel length (approximately 350 feet).
C	Downstream Adjacent	Channelization of Berryessa Creek through the existing basin, with construction of a new basin located near the existing basin outlet.
D	Morrill	Channelization of Berryessa Creek through the existing basin, with construction of a new basin downstream of the Greenbelt Reach near Morrill Avenue.
E[1]	Authorized	Construction of a new sediment basin upstream of Old Piedmont Road and modification of existing basin with plunge pool, outlet weir, and 3-foot diameter culvert drain.

Notes: 1. Alternative E is the Proposed Sediment Basin per the 1993 GDM Authorized Project Design. (USACE 1993).

An evaluation of the advantages and disadvantages of each configuration concluded that a combination of the above alternatives would best balance maintenance needs against environmental impacts and hydraulic conveyance capacity. These alternatives are currently under consideration by others, and the design of features within the project reach should be coordinated with the design process of the upstream sediment basin in order to ensure consistent approaches. Recommendations and further details on the sediment basin evaluation are presented in a Technical Memorandum dated January 21, 2009 by Tetra Tech, Inc. (2009a).

Figure 3-13 Plan View of Alternative Sediment Basin Configurations

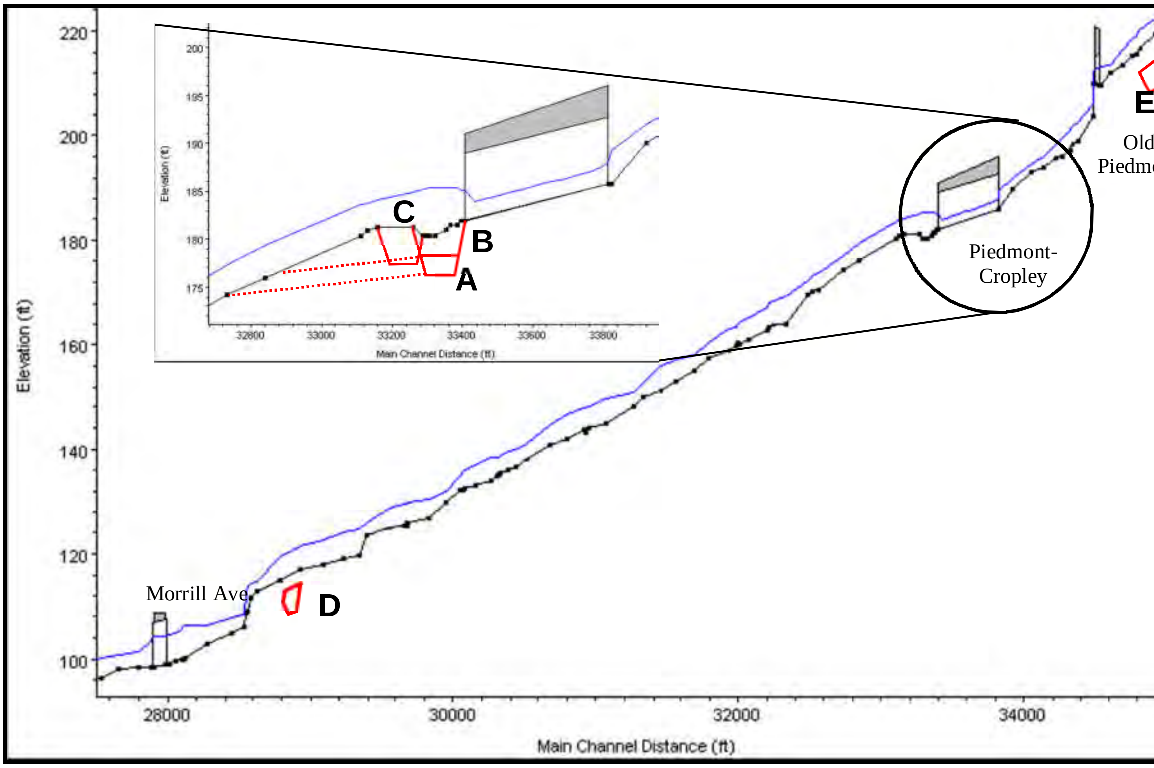

Figure 3-14 Profile View of Alternative Sediment Basin Configurations

CHAPTER 4: RECOMMENDATIONS FOR ADDITIONAL ANALYSES

To support the further development of the preferred alternative once selected, additional analyses and investigations related to the determination of sediment transport conditions within the project area should be performed. These analyses will assist in refining the design and providing a project that functions properly in relation to geomorphic and sediment transport conditions. The recommended investigations and analyses include the following:

- Perform inspections of the major tributaries entering the project to assess their sediment contribution and whether there are opportunities for sediment management on the tributaries. Past studies have focused on the main Berryessa Creek drainage since it is the largest sediment source; however, some opportunities may exist to improve sediment transport conditions within the project by addressing the supply of sediment from the tributaries.

- The HEC-6T model developed for the without-project condition should be applied to with-project condition. The results from the without-project condition showed that the model reasonably predicts the locations of sediment deposition and scour. The following are specific recommendations for the HEC-6T effort:

  - The model should be developed as an assessment and design tool for the preferred alternative rather than being applied in the alternative selection process. Application of the sediment transport and geomorphic assessment presented in this report should be adequate during the plan selection effort.

  - The current model uses only one sediment size distribution for the entire project area. This assumption should be reviewed and the possibility of utilizing several distributions as conditions change should be evaluated. This should be considered in terms of both the surface and subsurface distributions.

  - Based on the review of the NHC (2003) report, it did not appear the sediment removal was incorporated into the modeling effort. Consideration of running multiple events and incorporating sediment removal should be considered.

  - In applying the HEC-6T model some thinning of cross sections may be necessary from those used in the current HEC-RAS hydraulic model.

- Further refinement of the project design in terms of the channel sections should be undertaken to reduce the wide variations in velocities that occur within short distances. Many of these rapid variations may be due to the concentration of the initial design effort on determining the levee heights and bridge modifications to contain the design floods. The initial design modifications addressed the channel cross section size and levee heights primarily. In the next level of design, some adjustment of the channel gradient may be incorporated to provide a design with more consistent hydraulic conditions.

- Design modifications for the alternatives at several of the bridges downstream of I-680 result in increased flow areas that consequently cause existing deposition trends to be exacerbated. Specific problem areas identified are at Calaveras Boulevard, the UPRR trestle and Montague Expressway.

- Scour analyses need to be conducted to determine toedown depths for toe protection. General scour from the HEC-6T analysis should be added to bend and toe scour estimates. Because of the many modifications at bridges, the adequacy of the piers and abutments must also be evaluated in terms of scour, both local and general.

- Sizing of bank protection needs to be undertaken. Additionally, the ability of the upper bank protection and the vegetation on the floodplains to prevent erosion needs to be assessed based on shear stress and velocities.

- The n-values (roughness coefficients) assigned to the various channel components need to be adjusted if further refinements are made in terms of decisions on the types of vegetation that will be established in each area.

- Further analysis of potential changes in the configuration of the Piedmont sediment retention basin and other sediment retention facilities upstream of Old Piedmont Road need to be performed to quantify sediment removal.

- A more quantitative comparison should be made between these sediment modeling results and other modeling carried out by Jordan (2009) using SIAM and GSTARS-1D where possible, to reinforce confidence in model results.

CHAPTER 5: REFERENCES

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CHAPTER 6: ADDENDUM 1

6.1 Summary and Excerpts from Colorado State University Doctoral Dissertation

A detailed study comparing Berryessa Creek with Penitencia Creek was conducted as part of a PhD dissertation by Brett Jordan at Colorado State University. Full citation information and a summary of parts of the dissertation most pertinent to this study prepared by Tetra Tech, Inc. are presented in the following paragraphs.

Jordan, B. (2009). *An Urban Geomorphic Assessment of the Berryessa and Upper Penitencia Creek Watersheds in San Jose, California*. Colorado State University, Fort Collins, CO.

6.1.1 Summary of Abstract

- A quantitative urban geomorphic assessment was conducted for the Berryessa Creek watershed to investigate the effects of urban hydrologic change, valley subsidence and river infrastructure elements on channel stability.
- 47 monumented cross sections over a 3000-meter reach of Berryessa Creek were surveyed in 2004. Cross sections were surveyed yearly after high flow season (winter) for 3 years to document changes in river processes and form.
- Detailed geomorphic field data were used to conduct hydrologic and sediment transport modeling and investigate the relative effects of hydrologic alteration, valley subsidence and river infrastructure on water yield, sediment yield and channel stability.
- Results of this analysis indicate system instability in the urbanized valley portion of Berryessa Creek is caused primarily by drainage area capture by the urban storm sewer network and engineered river infrastructure elements.
- Hydrologic and sediment modeling indicates that these drainage system modifications have caused a water yield increase of 48 % and sediment yield increase of 9 % to 61 % based on historic conditions.
- Changes in the Berryessa Creek hydrological regime have transformed previously depositional reaches into incised reaches. Results of modeling indicate the maximum incision due to valley subsidence would be 0.27 m.
- Effects of base level lowering will be at a maximum approximately 500m upstream of the zone of maximum subsidence, which is minor increase in sediment yield of 0.3 % to 11 %. River infrastructure (an online sedimentation basin and 1.85 m grade control structure) has reduced the downstream sediment yield by 15 %.
- Subsidence effects from groundwater extraction are obscured by current channel instability caused by urban development which dominate system changes.

6.1.2 Summary of Introduction

- Methods of analysis: 1. time series aerial photos, topographic data, long profile analysis. 2. Field data collection. 3. Numerical hydrology and sediment transport modeling.

- The Berryessa watershed is an alluvial fan that has been anthropogenically manipulated along the valley floor to facilitate agriculture and urban development.
- Berryessa has been subject to channel realignment, engineering infrastructure, floodplain encroachment, drainage area expansion via storm sewers and has suffered severe erosion and sedimentation problems (e.g. in Summer 2004 approximately 7,100 m^3 sediment was dredged from two reaches of Berryessa; in comparison there was very little removal of sediment from fish ladder structures on the less modified Penitencia Creek).
- This dissertation contains a large literature review about effects of urbanization on watershed hydrology, sediment transport and ecology.
- Land subsidence of up to 3.5m was observed in parts of the Santa Clara Valley between 1934 and 67 due to groundwater pumping.

6.1.3 Summary of Methodology

- Page 29 contains useful table of all data collected.
- The study examined a time series of long profiles. Berryessa Creek has undergone 1.5m or more incision or mechanical sediment removal in reach where the steep upland transitions in valley flat, this reach would be expected to be depositional. The reason for this is channelization and floodplain encroachment.
- Page 36 presents the change in bed level over time. More scour than deposition is evident on Berryessa Creek.
- Historical aerial photography analysis showed in 1899 there was no defined channel on Berryessa Creek below mountain range, just the alluvial fan with multiple small paths. By 1939 the single thread channel had been formed by channelization to permit agriculture on the fan, development and flood control. Lengthening of the channel decreased the slope significantly. In 1899 it was 0.02, 1930s it was 0.01, 1950s it was 0.005. The natural stream response of reducing the gradient was to aggrade.
- Subsidence by reach on Berryessa: Reach 1: 1125-2000: 0.11m, Reach 2: 710-1125: 0.14m, Reach 3: 250-710: 0.23m. Normal base-level lowering causes increase in sinuosity. Conversely an increase in urbanization normally results in decrease in sinuosity due to lateral restraints and channelization.
- Reach 1: most upstream. Between 1939 and present a decrease in sinuosity due to channelization 1960-80 is observed. Reaches 2 and 3: no channelization has taken place, trend of increased sinuosity, likely due to increased discharge and reduced sediment load.
- Similar trends were observed in the meander belt width.
- Urbanization mainly occurred in the valley areas between 1960s and 1980s; little urbanization has taken place in the upper watershed.
- A drainage area expansion took place on Berryessa due to addition of two historic alluvial fan streams. In 1899 the drainage area was 13.0 sq km, in 2002 it was 15.5 sq km.
- The watershed is located on active Hayward fault. Large landslide activity delivers large sediment load to channel.
- Previously change in valley grade from steep uplands to flatter valley means sediment is deposited at interface. Berryessa sediment basin was constructed in 1962 has

reduced sediment deposition and can easily be excavated but sediment continuity downstream has been disrupted.

- Sediment has been dredged every 2 years between 1984 and 2004. The basin is effective at capturing large particles (>16 mm) transported as bedload. This has caused channel incision downstream.
- Summary: Upper Berryessa watershed is not urbanized, the lower watershed has become 85 % urbanized over last 100 years. Changes in hydrology magnify peaks and duration of flows capable of producing bedload transport in Berryessa Creek. A trend for downgrading and incision has been observed. (1.5m of incision between 1967 and 2004 downstream of the sedimentation basin). Berryessa has only subsided 0.23m (Penitencia 1.1m).
- Cross sections were resurveyed and the average bed change was calculated. Over 65% of Berryessa cross sections are degrading.
- Manning's n for Berryessa was considered to range between 0.037 and 0.064, with a mean of 0.047.
- Pebble counts conducted at each cross section. Page 89 contains a bed material size plot over the long profile.
- Bulk sampling was carried out. Berryessa shows fining (as would be expected) moving downstream. There is a sharp drop in size after the sediment basin as coarse particles are trapped in the sediment basin.
- Bank condition reconnaissance was carried out and the following sediment properties were recorded: depth of layer, sphericity (round, angular), texture, color, clast matrix supported structure, grain size, sorting.
- Bank height and angles were measured visually for stable and unstable bends. Bank height to depth ratio has been proposed as a measure of stability.
- Erosion pins (referred to as "bank rods") were installed for the winter 2004 season and monitored until 2006. Bank retreat ranged from 0 to 0.36m/yr.
- Bank material varies considerably between stratigraphic units.
- 15 min stage and discharge data was collected in 2005 and 2006. Bedload and suspended load were measured to develop a rating curve. Bedload sizes were measured at two locations on Berryessa.
- Rating curves for bedload and suspended were developed, although plots exhibit a considerable amount of scatter even with log-log axes. Comparing Berryessa to Penitencia, Berryessa has much large supply of sediment than Penitencia. Upland reaches of Berryessa have a considerable amount of landslide activity and colluvial sediment sources.

6.1.4 Hydrological Modeling

- Processes that have lead to flow regime changes on Berryessa Creek include increase in watershed impervious area and increased connectivity/changes in catchment area.
- A calibrated hydrological model was created in HEC-HMS. Three different simulations carried out.
- Upper watershed is characterized by steep slopes, clay/gravely loam soils with low infiltration rates. The valley has low relief, sandy soils and higher infiltration rates.

- Urbanization in the Berryessa watershed has caused a net increase of 14 % in urbanized land use for whole watershed. Diversions have created a 20 % increase in effective catchment area, causing higher peak flows and volumes.
- Hydrographs currently have higher peak discharges and more flashy time to concentration due to efficiency of the storm drains than historical conditions, resulting in multiple peaks for an event that would previously have a single peak.

6.1.5 Sediment Transport Modeling

- Two sediment transport models were used to evaluate urbanization and valley subsidence effects on channel stability: SIAM (snapshot in time) and GSTARS-1D (continuous simulation used to predict long term channel changes).
- Six versions of each model were produced for Berryessa Creek: two different geometries – historic (1939), current (2004) with urban infrastructure, current (2004) without urban infrastructure.
- As part of the dissertation efforts, a HEC-RAS model was developed by Colorado State University (CSU) independently from the Corps of Engineers model. The CSU HEC-RAS model was used to create the SIAM model. Ten SIAM reaches were used.
- A sediment transport function sensitivity analysis was carried out. Ten equations were tested. The synthesized results were compared with measured suspended load and bedload data, and observed morphology changes. Yang (1973) and Yang (1984) appeared to be most accurate and were selected for model use.
- 30-year simulations carried out with GSTARS-1D. The models do not include subsidence.
- Model results were compared to field observations. SIAM produced results closer to observed results than GSTARS-1D. Both models provide reasonably close predictions. SIAM showed a good agreement with amount of sediment deposited in the Berryessa basin on annual basis (compared against the dredging records).
- Models indicate that the watershed changes on Berryessa would induce significant channel change, especially in downstream reaches: change from deposition to incision, increase in sediment yield.
- Models indicate that instability problems may be introduced to the upstream reaches by removing the grade control structure on Berryessa Creek: degradation upstream, aggradation downstream.

6.1.6 Appendices

- Bankfull dimensions by cross section, superimposed surveyed cross sections from 2004/2005/2006 and bed material size data are presented.

Letter No. 4

Valley Transportation Authority

Date Received: 11/13/2015

From: Molseed, Roy
To: James Manitakos
Subject: Berryessa Creek DEIR
Date: Friday, November 13, 2015 9:16:10 AM

James,

VTA has no comments on the Draft EIR for the above referenced project. Thanks.

Roy Molseed
VTA
(408) 321-5784

Letter No. 5

Citizens Committee to Complete the Refuge and Santa Clara Valley Audubon Society

Date Received: 11/30/2015

November 30, 2015 ***Via E-mail***

James Manitakos
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118
JManitakos@valleywater.org

RE: Draft EIR for the Upper Berryessa Creek Flood Risk Management Project

Dear James:

On behalf of the Citizens Committee to Complete the Refuge (CCCR) and the Santa Clara Valley Audubon Society, this letter provides comments responding to the Draft EIR (DEIR) for the Upper Berryessa Creek Flood Risk Management Project (Project) of the US Army Corps of Engineers (Corps) with the Santa Clara Valley Water District (District) as local partner.

We are very grateful for the extension of time that the District provided to us, past the published deadline. It is unfortunate that we were not aware of the Project and its comment period earlier. Together we represent environmental groups that see the interconnectedness of the health of our streams from top to bottom of our watersheds. Actions taken on any portion of a watershed's drainage can have significant upstream or downstream impacts. To that end, the CCCR and several other local environmental groups have been active participants in Stakeholder meetings of the District's Integrated Water Resources Plan, now called OneWater. We bring that perspective to these comments.

Despite the fairly short time we've had for review, and given the 14-year history of this Project, its public process and accumulated documentation, we have found some areas of concern or of questions that we present here.

Project Overview: The Project is intended to reduce the flood risk associated with the Project area (existing Berryessa Creek channel and levees extending northward from I-680 to Calaveras Boulevard) most of it located in the City of Milpitas but with a small southerly segment in the City of San Jose. The Project will be consistent with the Project Plan selected by the Corps' Director's Report of May 29, 2014 with changes needed to allow the Project to meet Federal Emergency Management Agency (FEMA) certification standards. The actions will include channel widening, changes to reduce instream erosion, floodwall construction on the west bank, replacement of a railroad trestle with a concrete box culvert, installation of new culverts at intersections with two creeks, vegetation removal and replacement, construction or upgrade of access roads and replacement of storm drains. Actions will result in the removal of a pocket park.

Summary of Key Concerns and Questions

NEPA and CEQA processes: Chronology, preparation and coordination of the NEPA and CEQA documents of the Project were inconsistent with the need to inform the public and involve all responsible agencies.

Adequacy under CEQA: On a number of important issues, the DEIR lacks sufficient information to provide adequate analysis. These include characterization of affected areas of Los Coches and Piedmont Creeks, classification of dredge soils and modelling that would demonstrate probable sediment deposition outcomes.

Project design: The Project design is based solely on the purpose of flood control using the antiquated trapezoidal design without attempt to incorporate, wherever possible, design elements that better mimic natural creek hydrology, ecological contribution and aesthetics.

NEPA and CEQA

We appreciate the District's recognition that FEMA certification needs to be an outcome of the Project, therefore initiating this DEIR. There is the question: wasn't that concern known when the Corps was preparing its Environmental Impact Statement (EIS), prior to 2013? As the Draft EIS was an integrated document, why didn't the District participate in it or, in parallel, prepare a DEIR? Wouldn't it have been suitable to include a FEMA certifiable alternative at that time?

These questions come to mind in light of the Corps' decision that it may invoke the Clean Water Act (CWA) 404r exemption. Under that action the Corps proposes replacing the San Francisco Bay Regional Water Quality Control Board (RWQCB) for Section 401 Water Quality Certification. Through our experience with other projects, we are aware that the certification process of the RWQCB requires the review of a Final EIR, per obligations of the State of California established under the Porter Cologne Act. While acting as the agent for the federal responsibility, the RWQCB also assures that particular water quality interests of the State are fulfilled, oversight that the 404r will not provide. Aren't the State's interests of value to this Project and to the District? If the District had produced a Final EIR in 2013, wouldn't that have provided time for a RWQCB 401 certification process to complete in time for construction to begin in 2016?

There is substantive concern that the Notice of Preparation of record is 14 years old. In this DEIR, the District explained that it tried but was unable to contact commenters to that NOP. The District must explain why a new NOP was not issued for this DEIR. It is quite likely that the affected and interested parties may have changed. For instance, are today's Milpitas residents and that City's park officials aware that they will lose a pocket park and its associated pocket ecosystem? Based on these considerations, It appears that the NOP should have been recirculated. That was the path the District followed not long ago, for its CEQA process for the Shoreline Feasibility Study, again local partner to the Corps. Please respond to these concerns.

Finally, the Notice of Availability (NOA) for this DEIR was inadequate, it being notable that five major, local environmental organizations were not noticed on it (Joint Letter to J. Manitakos, 11/12/15). Given the long, forgotten NOP, the District needed to make a very significant effort to deliver the NOA to interested parties which it did not.

ADEQUACY UNDER CEQA

Under the heading of "Basic Purposes of CEQA" in the General Concepts, 14 CCR § 15002, the first listed purpose is:

> (1) Inform governmental decision makers and the public about the potential, significant environmental effects of proposed activities.

Toward that end, we share comments here on issues that inadequately meet the need to inform by omission, by use of assumption or, perhaps, by simple oversight of information relevant to associated impacts and mitigations.

Piedmont and Los Coches Creeks: The Project Description includes the following statement:

> "Installation of concrete box culverts and wingwalls at Los Coches and Piedmont Creeks, with access roads constructed over the top of the culverts."

Subsequently the DEIR explains that the new culverts will improve contributory creek hydrology, angled to direct flow downstream and a change removing the current right angle juncture. These are major changes to creeks that contribute to the flood risks of upper Berryessa and for which a full characterization is needed of the affected area of each creek. What are the existing uses on the adjoining land such as where the access road will go? Might the new culvert have upstream impacts and are they beneficial? Given Los Coches upstream extent, what level of sediment does it transport?

Sediment Deposition and Maintenance: In discussion of Hydrology Impact WAQ-3, the section on operations includes the following:

> "Although reduced velocities and lower water surface elevations *may* reduce the sediment transport capacity, this effect *is likely* to be balanced by decreased erosion and diminished sediment input. Furthermore, any backwater effect that occurs where the downstream end of Reach 1 at Calaveras Boulevard transitions into the Lower Berryessa Creek channel *would be* eliminated when the Lower Berryessa Creek Program is constructed, further reducing sediment deposition in the lower end of Reach 1." (Ed. Note: italics added)

This argument, supporting a conclusion of less than significant impact, uses the assumptive "may", "likely" and "would" as its basis. Were these assumptions tested through hydrologic modelling? This is a 2.2 mile long project. How can it be known if the Lower Berryessa Project "would" have a beneficial sediment transport impact in Reach 1 or possibly further upstream? The geomorphology discussed in Section 3.17.2.1 is of a stream with minimal gradient throughout its length, with slope in the range of a mere 0.35% to 0.5%. With the widened channel reducing water velocity, detailed analysis needs to be evident to demonstrate whether or not sediment deposition is significant. Will the Project necessitate increased frequency for maintenance dredging to ensure the flood risk reduction is achieved long term? If analysis exists that supports the DEIR's conclusion, please provide it.

Contaminated Soil Testing and Disposal: As discussed in detail in the DEIR, a substantial area of Reach 2 of the Project is affected by locally historic spills of hazardous materials at sites adjoining or near enough to have produced large plumes that run below the creek. These spills introduced a number of volatile organic compounds (VOC) and other hazardous materials into the environment. While the responsible businesses no longer exist, monitoring and mitigation of these spills is ongoing.

Two of the sites are each the source of the separate, large plumes: The former Jones Chemicals Inc. adjoins and is parallel to the creek. The other, the former Great Western Chemical Company, is set back about a block from the creek. Due to their proximity, additional testing was performed for the DEIR along that area of Reach 2. Soil tests were conducted of core samples collected by boring along the creek's access road. Results showed that VOC concentrations detected in the upper 15 feet (as deep as

the Project expects to dredge the channel) are below risk-based screening levels. On this basis, the DEIR states that reuse and transport of soils off-site for disposal would be classified non-hazardous. As a result, no hazardous waste impact addresses soil testing.

While the tests results are relevant, the expanse of the contaminated area and the possibility that pockets of higher contamination levels may exist questions whether such a conclusion is adequate environmentally. The existing conditions imply that all due caution is needed. We are aware that clean soils from other District creek projects are transported for reuse by the South Bay Salt Pond Restoration Project for sensitive restoration actions. As a responsible agency, all appropriate precaution should be taken by the District to assure that there is no likelihood that hazardous levels of VOCs or other contaminants are present before transport for any other reuse. Prior to transport, the Project should be monitoring soil for such hazards.

<u>State Regulation of Plants and Wildlife</u>: The Project took guidance for Biological Resources impacts from the US Fish & Wildlife Service response to the Corp's Integrated Document, finalized in 2013. While that guidance is appropriate, it is not sufficient in California. The California Department of Fish & Wildlife (CDFW) sets requirements that provide protection for Species of Special Concern as well as for protection of sensitive habitats e.g. nesting birds. These regulations need to be applied in mitigation BIO-A (p. 3-69) during construction, in addition to the USFWS requirements. From the DEIR:

> "Mitigation Measure BIO-A would require pre-construction nesting bird surveys and establishment of appropriate buffers, reducing impacts to nesting resident bird species. "

This statement leaves open the question of what "pre-construction" means nor does it establish a time-of-year. Whenever possible, construction should not occur during nesting season. If done during nesting season, then special precautions are necessary. Birds can build a nest, lay eggs, and start raising young within two weeks, and an entire reproductive cycle may start and end within 30 days. Mr. Dave Johnston, Environmental Scientist, CDFW, recommends that pre-construction and pre-vegetation removal surveys should occur no more than 24 hours before work commences. If work in a particular location stops for more than 24 hours (such as over a weekend or holiday), surveys should be done again before work recommences. Surveys should take place at all locations within 300 feet of actual project activity and if the project 'moves" to a new location then the buffer and surveys should move as well. Mr. Johnston also recommends a preliminary survey 30 days ahead of time to give the project proponent an idea of what to expect once they are ready to begin work.

It is important too to survey for ground-nesting birds in addition to those that nest in shrubs and trees. Surveys for ground-nesting birds should be performed 24-hours prior to vegetation removal or disturbance. If nests are found, buffers would be set and work within the buffer areas should be postponed until the nestlings have fledged. If raptors or special status species nests are found, CDFW should be called on to set appropriate buffers.

<u>Pocket Park</u>: The pocket park near the juncture with Los Coches Creek, is planned for removal by the Project to make way for an access road. As mentioned previously, we are curious as to whether the current residents are informed on the removal. In the Recreation analysis, it is noted that the next closest city park is a mile from the Pocket Park site, on the other side of I-680. Under the DEIR's land use analysis, the existing conditions mention "relatively small amounts of single family residential and parks/open space" and then does not further address the impact of replacing the park/open space with an access road. The Land Use and Recreation sections both refer to Milpitas trail plans but do not explain if the possibility of using the access road in a trail system is accepted as suitable mitigation for

loss of the Pocket Park and of the pocket-ecosystem it provided. The loss requires formal, specified mitigation.

PROJECT DESIGN

Our review of this Project sparked disappointment. Here we see again a long trapezoidal channel designed only for the purpose of water transport, having long spans devoid of any shade nor of any other functions that a creek can provide. This is inconsistent with the direction that creek actions have taken in recent decades and is not the preference of local jurisdictions.

The DEIR reports the expectation that the City of Milpitas will one day incorporate the extended access roads in its trail system. To that point the DEIR provides the following quotes from the City's General Plan:

> 4.g-I-7. Ensure that all landscaping within and adjoining a Scenic Corridor or Scenic Connector enhances the City's scenic resources by utilizing an appropriate scale of planting, framing views where appropriate, and not forming a visual barrier to views; and relates to the natural environment of the Scenic Route; and provides erosion control.
>
> 4.g-I-13 - Develop the section of Berryessa Creek which runs through the Town Center into a scenic as well as a recreational resource for the Town Center. Town Center is found on both sides of the creek along the Calaveras Boulevard corridor, and includes approximately 800 feet of the channel area in Reach 1.
>
> 2.a-I-17. Foster community pride and growth through beautification of existing and future development.

Or consider DEIR quotes from Envision 2040, the San Jose General Plan:

> Development adjacent to creekside areas should incorporate compatible design and landscaping, including appropriate setbacks and plant species that are native to the area or are compatible with native species.
>
> Development should maximize visual and physical access to creeks from the public right-of-way while protecting the natural ecosystem. Consider whether designs could incorporate linear parks along creeks or accommodate them in the future.

Clearly these jurisdictions value the aesthetic contribution that a shaded, vegetation-lined creek can provide.

The 2001 NOP listed the following objectives:

1) Improve flood protection in the cities of San Jose and Milpitas;
2) Reduce sedimentation and maintenance requirements in the creek;
3) Provide for recreational amenities;
4) Integrate ecosystem restoration into the project.

Unfortunately, that NOP describes a project that would involve a much longer length of the creek and does not help us know what the intentions were for the portion that is now this Project. Even so, the principle of ecological consideration as part of the design is consistent with inclusion of such action at whatever location it is possible, improving and going above and beyond, in this case, the function of flood control. This Project plans to hydroseed the slopes of the rebuilt creek and plant replacement

trees within the Project but it does not discuss such planting as ecological improvements nor suggest an objective to produce an attractive, multi-functional, waterway-focused community amenity.

This Project is funded, in part, by the District's Safe, Clean Water & Natural Flood Protection Program, a program that was approved in 2012 by well over two thirds of the voters. The Programs web page has the following:

> "The voters of Santa Clara County clearly recognize the importance of a safe, reliable water supply. They value wildlife habitat, creek restoration and open space."

Considering these planning principles together, it saddens us to see a District Project that is so out of sync with the design preferences of today. The mitigation for tree removal states that the Corps will plant replacement trees in the "vicinity." The Project should develop that action jointly with the local jurisdictions, toward an outcome of an improved water course that attracts and enriches the community.

We again thank you for this opportunity to comment. Our 501(c)(3)nonprofit organizations make it a practice to review and comment on projects that are of environmental importance to the community and wildlife alike. If there is any need for further contact on this matter, the District should contact Eileen McLaughlin at wildlifestewards@aol.com or 408-257-7599.

Sincerely,

Eileen McLaughlin, Board Member,
Citizens Committee to Complete The Refuge

Shani Kleinhaus, Environmental Advocate,
Santa Clara Valley Audubon Society

Appendix H Draft Groundwater Management Plan

DRAFT

GROUNDWATER MANAGEMENT PLAN

UPPER BERRYESSA CREEK FLOOD RISK MANAGEMENT PROJECT
JONES CHEMICAL INC. PLUME AREA
MILPITAS, SANTA CLARA COUNTY, CALIFORNIA

Prepared for:

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3686

Prepared by:

Tetra Tech, Inc.
17885 Von Karman Avenue, Suite 500
Irvine, California 92614-6213

January 6, 2016

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ABBREVIATIONS AND ACRONYMNS

AOI	Area of Interest
bgs	below ground surface
DCA	dichloroethane
DCE	dichloroethene
DDR	Design Documentation Report
EPA	Environmental Protection Agency
ESL	Environmental Screening Levels
FEMA	Federal Emergency Management Agency
GAC	granular activated carbon
gpm	gallons per minute
GWMP	Groundwater Management Plan
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
JCI	Jones Chemical, Inc.
JSAs	Job Safety Analyses
MCL	maximum contaminant level
ND	not detected
NPDES	National Pollutant Discharge Elimination System
PCE	Tetrachloroethylene
PVC	Polyvinyl chloride
RCRA	Resource Conservation and Recovery Act
SFBRWQCB	San Francisco Bay Regional Water Quality Control Board
TCE	Trichloroethylene
TCLP	Toxicity Characteristic Leaching Procedure
TDS	total dissolved solids
UPRR	Union Pacific Railroad
USACE	United States Army Corps of Engineers
VC	vinyl chloride
VOC	volatile organic compound
µg/L	micrograms per liter

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1.0 INTRODUCTION

This Groundwater Management Plan (GWMP) has been prepared to guide field activities within the Jones Chemical, Inc. (JCI) groundwater plume during implementation of the Berryessa Creek Flood Risk Management Project (the Project). This GWMP will be implemented by the Construction Contractor as part of the Project that is being managed by the United States Army Corps of Engineers. In general, the GWMP defines the conceptual approach for the extraction, conveyance, and treatment of groundwater within the Area of Interest (AOI) that is bound by the intersection of the Project and the JCI groundwater plume (see Figures 1 and 2). This GWMP does not apply to any work performed outside the AOI and will only be utilized if groundwater is encountered by the Construction Contractor while performing work within the AOI.

2.0 SUMMARY OF GROUNDWATER CONDITIONS

This section summarizes the AOI boundaries, Project area hydrogeology, and the conditions associated with the JCI groundwater plume.

2.1 Area of Interest Boundaries

The AOI is bound by the Project boundaries and the JCI groundwater plume. As shown on Figure 2, the dimensions of the AOI where channel construction will take place are approximately 70 feet wide by approximately 1000 feet long, or approximately from Station 155+00 to Station 165+00 on the construction plan sheets The sequencing of work within the AOI will be at the discretion of the Construction Contractor. However, for the purposes of this GWMP, it is assumed that the Construction Contractor will perform work in 300-foot sections, excavating and backfilling each 300-foot section before progressing to the next section. It will take approximately 2-4 weeks to complete the work within the AOI.

2.2 Project Area Hydrogeology

The Project area is underlain by interbedded alluvial sediments composed of sand, gravel, silt, and clay. The uppermost 5 to 10 feet of the subsurface consists of fill material, which is clay, gravely clay, sand, and gravel. Sediments underlying the fill material predominantly consist of clay, silty clay, and sandy clay, with variable amounts of sand and gravel. The clays encountered in soil borings contain intervals of sand ranging in thickness from several inches to approximately 11 feet. Historically, the depth to groundwater within the AOI has ranged between approximately 7 to 20 feet below ground surface (Tetra Tech, 2015a, and http://geotracker.waterboards.ca.gov/profile_report.asp?global_id=SL18213593).

Tetra Tech drilled a soil boring in the AOI in December 2014 (Tetra Tech, 2015a); a saturated zone was encountered from 15.5 feet bgs to 19 feet below ground surface (bgs), returning to slightly moist soil conditions from 19 feet to 20 feet bgs. Upon removal of the drilling rods, the groundwater level rose to 13 feet below grade in the boring.

Historical groundwater elevation data collected at and near the project area indicate groundwater flows generally toward the west-northwest.

2.3 Contaminants

The groundwater beneath the AOI is impacted by volatile organic compounds (VOCs), attributed to the 1982 chlorinated solvent spill at the former JCI Facility. The following VOCs have recently been detected in shallow groundwater within the AOI at concentrations exceeding maximum contaminant levels (MCLs): tetrachloroethylene (PCE), trichloroethylene (TCE), trans–1,2-dichloroethene (t-1,2-DCE), cis-1,2-DCE, 1,1-dichloroethane (1,1-DCA), 1,1-DCE, and vinyl chloride (VC). The Semiannual Groundwater Monitoring Reports dated February 27, 2015 (Arcadis, 2015a) and August 31, 2015 (Arcadis, 2015b) for the former JCI facility indicate that VOCs were detected during these two reporting periods in JCI groundwater monitoring wells B14, B15, B19, B58, and B59 (the JCI groundwater monitoring wells that are closest to the AOI) at concentrations that ranged from not detected above the laboratory reporting limit (ND) to 1,400 micrograms per liter (ug/L) as shown on Figure 1. These data are summarized and compared to the pertinent MCL and San Francisco Bay Regional Water Quality Control Board (SFBRWQCB) Environmental Screening Levels (ESL) in Table 1 in the Tables Section following the report narrative.

3.0 BERRYESSA CREEK WIDENING PLANS

Upper Berryessa Creek will be redesigned to provide flood damage reduction benefits from the overpass of I-680 to the upstream side of Calaveras Boulevard. The increased flood protection will include Widening to add capacity and bank protection to provide channel stability.

The major features of the project in the AOI include widening the creek channel, installing a concrete box culvert to replace an existing railroad trestle, and expanding or surfacing existing access roads with aggregate paving. Figure 3 shows the following features:

- The channel banks would be excavated with 2H:1V channel sideslopes.
- Buried rock revetment would be placed for scour protection from the toe of bank to between the 2.5-year and 10-year flood elevation, with the installation of biodegradable erosion control blankets and vegetation between the top of the rock revetment and the top of the bank
- The existing Union Pacific Railroad (UPRR) trestle bridge would be replaced with a double-barreled box culvert, with Concrete, warped wingwall transition structures upstream and downstream of the newly-constructed UPRR trestle.
- Two aggregate-paved maintenance roads, 18 feet wide and 15 feet wide will be located on the right and left banks looking downstream, respectively, within this area.

As shown in the profile on Figure 3, proposed excavation typically ranges from 1-3 feet below the current channel bottom and approximately 12-13 feet below ground surface (bgs) at areas proposed for widening of the channel. In the AOI, borings conducted in 2014 found saturated soils approximately 15-20 feet bgs. Results from 2014 monitoring well data for this location yielded an average depth to groundwater of 12.1 feet bgs.

3.1 Construction Methodology

The main construction components listed below are provided in roughly the sequence in which they would occur, although several of the components may occur concurrently. In addition to these construction components, the railroad trestle bridge that is within the AOI will be replaced. This replacement includes

removal of the existing bridge and placing a prefabricated concrete box culvert upon which UPRR will replace the track.

- Utility relocations
- Clearing and grubbing
- Excavation with dewatering as required
- Placement and compaction of fill
- Placement of geotextile fabric
- Importing and placement of rock revetment
- Placement of biodegradable turf reinforcement mats
- Plantings as required
- Placement of aggregate base on the access roadways

3.2 Import and Disposal

Soil, reinforcing steel, vegetation, and concrete will be excavated during construction. Some of the clean excavated soils will be reused on-site. Vegetation will be composted, steel and concrete debris will be recycled, and the balance of the materials will be disposed of at one or more approved landfills.

3.3 Construction Equipment and Workers

The following equipment is anticipated to be used during Project implementation within the AOI:

- Backhoes
- Bulldozers
- Cranes
- Compactors
- Concrete trucks
- Graders
- Excavators
- Jackhammers
- Dump trucks/haul trucks
- Loaders
- Pumps
- Scrapers

Construction will either occur over two dry seasons from May to October, or continuously for one year. Construction hours will generally be during normal business hours, but after-hours work may be needed for concrete pours or replacement of the existing UPRR trestle with a concrete box culvert. The types of construction equipment in use and the number of workers actively working at the project area will vary depending on the phase of construction. The number of workers present on any given day is estimated at 25 in general, and up to 40 on occasion.

4.0 PERMITTING EVALUATION

A Notice of Intent will not be submitted to obtain coverage for managing groundwater associated with the AOI under the National Pollutant Discharge Elimination System (NPDES) general permit. As a result of not obtaining this permit, the SFBRWQCB has required the preparation and submittal of this GWMP which provides the methods and procedures for controlling and diverting groundwater, if necessary, while working within the AOI, as identified in their August 14, 2015 non-enforcement letter and included in Attachment A.

Prior to discharge, the AOI groundwater will be treated to meet the standards set forth in the NPDES General Permit No. CAG912002 (NPDES Permit) for fuel and VOC impacted sites under the requirements of SFBRWQCB Order No. R2-2012-0012 (SFBRWQCB, 2015).

If dewatering wells are installed to lower the water table (see Section 5.0), the Construction Contractor will obtain all appropriate permits which can include permits and/or authorization from the Santa Clara Valley Water District to install and abandon the wells.

5.0 DIVERSION AND CONTROL OF AOI GROUNDWATER

Depending on field conditions at the time of Project implementation, it may be necessary to control and divert groundwater to achieve the Project objectives and comply with Project requirements including excavation, placement of material, and soil compaction. As is the case throughout the Project reach, the Construction Contractor will determine whether groundwater control and diversion is necessary in order to, for example, lower the groundwater level at the start of construction or limit water seepage into the construction zone during construction.

This GWMP applies only to work within the AOI. In addition to this GWMP, all work within the AOI shall be performed in accordance with the Project Rain Event Action Plan, design drawings, specifications, permits, Design Documentation Report (DDR), and other pertinent requirements that are part of overall Project construction.

If the Construction Contractor (1) determines that groundwater will be exposed and/or encountered within the AOI, or (2) if groundwater is exposed and/or encountered within the Project AOI during construction, the Construction Contractor will control and collect the groundwater, prior to treatment and discharge, by selecting and implementing one or a combination of the following methods. Both are considered acceptable. The Contractor's selection will consider the observation of field conditions, effectiveness of the methods, and relative time and cost.

- Constructing cofferdams at the downgradient end of the AOI or sections of the AOI that are under construction; and/or
- Installing and operating dewatering wells.

5.1 Cofferdam

If the Construction Contractor opts to design, construct, and utilize a cofferdam for groundwater control and diversion, the Construction Contractor will grade the AOI to direct groundwater flow to the cofferdam where the groundwater will be temporarily stored until it is pumped to the groundwater treatment equipment that is described in Section 6.0. If groundwater is too evenly spread across the surface to be effectively pumped to the treatment system, the Construction Contractor may decide to provide interim grading to one location and/or implement a small basin or sump from which to pump. The size of both the cofferdam and any sump that may be required, as well as the period of time that the cofferdam is required to contain water, is dependent on the field conditions at the time of construction.

In accordance with SFBRWQCB guidelines, the Construction Contractor shall submit to the Project Engineer for review, a cofferdam design that, at a minimum, identifies the following:

- Construction material
- Height of structure(s)
- How the area will be dewatered
- Overtopping precautions such that overtopping will not occur, and

- Discharge locations and structures

The treated groundwater will be discharged downstream in Berryessa creek.

5.2 Groundwater Wells

Alternatively, the Construction Contractor may opt to install and operate shallow dewatering wells to lower the water table prior to commencing work within the AOI. Dewatering contractors with extensive San Francisco Bay experience estimated that dewatering groundwater in the project area will require approximately 20 groundwater extraction wells on 50-foot centers to lower the shallow groundwater table.[1] The exact spacing of the dewatering wells may vary based on the amount of groundwater encountered during construction. The extraction wells, if installed, will be located along the west side of Berryessa Creek as shown on Figure 4. The extracted water will be pumped above ground to the treatment plant that is described in Section 6.0 prior to subsequent discharge.

5.2.1 Well Spacing and Expected Pumping Volume

The dewatering wells, if installed, are anticipated to initially operate at approximately 40 gallons per minute (gpm) each. Once the water column in each well and the gravel pack around each well are dewatered, the sustainable extraction rate will likely decrease to a sustainable rate of approximately 5 gpm per well.

Assuming that 20 wells will be installed along the 980-foot length of the AOI, the combined extraction rates are anticipated to range between100 and 800 gpm. Alternatively, the Construction Contractor may opt to dewater one section (see Section 2.1) at a time, in which case the flow rate is expected to range between 30 and 240 gpm.

5.2.2 Typical Dewatering Well Construction Details

The extraction wells, if needed, will be approximately 40 feet deep, screened from 10 to 40 feet below ground surface and will be constructed of six-inch schedule 40 polyvinyl chloride (PVC).[2] The 30-foot length screened interval is anticipated to provide sufficient drawdown for the water elevations that may be encountered during construction. Each well will be equipped with a dedicated, variable-rate pump; the extracted water will be pumped above ground to the treatment plant that is described in Section 6.0 prior to subsequent discharge. The wells shall be powered by a single, portable, trailered diesel-powered generator.

The trailered diesel-powered generator shall be installed on the Project overbank to avoid potential risks associated with rain events and any external fuel tanks will also be placed on the Project overbank. The Construction Contractor shall take necessary precautions that any wiring, conduit, or pipe connecting the generator(s) to the wells shall not be damaged by construction vehicles.

[1] January 17, 2015 telephone conversation between Adam Medina, Viking Drillers, Inc. and Keith Hoofard, Tetra Tech

[2] Depth based on conversations with experienced personnel as referenced in footnote #1 on this page.

6.0 GROUNDWATER TREATMENT AND CONVEYANCE EQUIPMENT

A temporary treatment plant will treat groundwater that becomes exposed and, therefore, subsequently collected per Section 5, above.

As shown on Figure 4, the temporary groundwater treatment plant can be located within the channel, adjacent to the AOI, and effectively isolated from any nuisance flow within the channel, if necessary, through the use of berms, K-rails, or other features at the Construction Contractor's discretion. The Contractor shall provide ramp access as part of the overall construction effort. These ramps shall be available for access to the temporary groundwater treatment plant. As an alternative to the in-channel location of the treatment equipment, at the Contractor's discretion, the equipment can also be located along the top of the channel as long as it does not interfere with construction activities.

A process flow schematic is provided as Figure 5. Groundwater will be pumped from the cofferdam or dewatering wells to the open-top equalization tank to allow sediments to settle out of the groundwater. From the equalization tank, the groundwater will be pumped through a *filtration train* that includes sand filtration and organoclay filtration vessels. These will provide a "polish" to the sediment removal to prevent blockage prior to being pumped through the *treatment train* which will remove VOCs by adsorption within the granular activated carbon (GAC) vessels. The treated water will then flow to a second open-top batch tank for temporary storage (as needed) and to allow a controlled discharge rate to Berryessa Creek. The point of discharge will be at the outlet of the open-top batch tank.

The Construction Contractor shall have sufficient cranes, forklifts, trucks, and personnel onsite while working within the AOI to remove all equipment associated with the temporary groundwater treatment plant within 24 hours of notification of a pending rain event. Typical specifications for a 100 gallon per minute temporary treatment system and a 700 gallon per minute treatment system are provided as Attachments C and D, respectively.

As shown on Figure 5, compliance-sampling ports will be located:

- after the final filter and before the first GAC vessel (INF-001);
- between the two GAC vessels (MID-001); and
- after the second GAC vessel, before mixing with any other water (EFF-001).

The treatment plant and extraction wells will be powered by portable diesel generators. The treatment plant and dewatering system may have to operate 24 hours per day, depending on treatment requirements dictated by the amount of groundwater flow at the time of construction. A photograph of a typical temporary groundwater treatment plant is provided as Attachment B for illustrative purposes. Note that the temporary groundwater treatment system that will likely be needed for the Project will be a smaller scale system compared to that shown in Attachment B.

7.0 COMPLIANCE MONITORING

This section presents procedures for sampling the treated groundwater. The analytical results of the treatment system samples will be reported to the SFBRWQCB as described in Section 9.0.

7.1 Compliance Sampling

Compliance sampling will be performed on the first and fifth days of operation, and will consist of collecting groundwater samples from sampling port INF-001 (see Figure 5) and EFF-001 (see Figure 5) in accordance with Table E-2 of the SFBRWQCB Order; the pertinent information from this table is reproduced in Table 2 in the Tables Section following the report narrative.

7.1.1 Compliance Sampling: Day 1 of Operation

The objective of sampling the influent and effluent groundwater on the first day of operation is to confirm compliance with the discharge standards. Groundwater from the AOI shall not be discharged to Berryessa Creek until compliance with the discharge standards is demonstrated. Thus, the treated groundwater will be discharged to a holding tank for temporary storage to prevent discharge to Berryessa Creek until compliance with the discharge standards is demonstrated as described in the following sections. Furthermore, the groundwater control, diversion, and the Construction Contractor may opt to shut down dewatering activities until compliance is demonstrated to reduce the amount of storage needed. If the system is shut down for more than 120 hours, the compliance sampling shall be repeated. System shutdown to reduce the amount of storage needed shall only occur if no consequences to construction activities within the AOI nor seepage downstream will occur due to a high accumulation of groundwater exposure as a result of the shutdown. If these consequences may occur, then additional storage facilities must be made available to preclude untreated groundwater from migrating downstream.

An influent groundwater sample shall be collected from sampling port INF-001 (see Figure 5) on the first day of operation. This influent groundwater sample shall be monitored in the field for pH and submitted to a state-certified laboratory for analysis of VOCs by Environmental Protection Agency (EPA) Method 8260B.

An effluent groundwater sample shall be collected from sampling port EFF-001 (see Figure 5) on the first day of operation. This effluent groundwater sample shall be monitored in the field for turbidity, pH, temperature, and electrical conductivity and submitted to a state-certified laboratory for analysis of: VOCs by EPA Method 8260B and total dissolved solids (TDS) by SM 2540.

The laboratory analytical results from the startup groundwater samples collected on the first day of operation shall be compared to the effluent concentrations identified in Table 2 of the Order (Column B: Discharge to Other Surface Water Areas), which is reproduced in Table 3 in the Tables Section following the report narrative.

If all of the effluent analytical results are less than the maximum daily effluent limitations listed above, the treated groundwater shall be deemed to be in compliance, and discharge of the treated water to Berryessa Creek may commence. If any of the effluent analytical results exceed the maximum daily effluent limitations listed above, discharge of the treated groundwater shall not be allowed and startup sampling shall be repeated until compliance is demonstrated. At the Construction Contractor's discretion it may be appropriate to replace the GAC to achieve compliance with the discharge standards.

7.1.2 Compliance Sampling: Day 5 of Operation

In accordance with the SFBRWQCB Order, the INF-001 and EFF-001 will be sampled on the fifth day of operation. An influent groundwater sample shall be collected from sample port INF-001, and monitored in the field for pH and submitted to a state-certified laboratory for analysis of VOCs by EPA Method 8260B.

An effluent groundwater sample shall be collected from sample port EFF-001, monitored in the field for turbidity, pH, temperature, and electrical conductivity, and submitted to a state-certified laboratory for analysis of:

- VOCs, EPA 8260B
- 1,4-dioxane, EPA 8270C
- total dissolved solids, SM 2540
- total (unfiltered) metals:
    - antimony, EPA 204.2 reporting limit 0.5 ug/L
    - arsenic, EPA 206.3 reporting limit 2.0 ug/L
    - beryllium, GFAA or ICPMS reporting limit 0.5 ug/L
    - cadmium, GFAA or ICPMS reporting limit 0.25 ug/L
    - hexavalent and total chromium, SM 3500 reporting limit 0.5 ug/L
    - copper, EPA 200.9 reporting limit 0.5 ug/L
    - cyanide, SM 4500-CN C or I reporting limit 1 ug/L
    - lead, EPA 200.9 reporting limit 0.5 ug/L
    - mercury, EPA 1631 reporting limit 0.002 ug/L
    - nickel, EPA 249.2 reporting limit 1 ug/L
    - selenium, SM 3114B or C reporting limit 0.5 ug/L
    - silver, EPA 272.2 reporting limit 0.25 ug/L
    - thallium, EPA 279.2 reporting limit 1 ug/L
    - zinc, EPA 200.8 reporting limit 1 ug/L

7.1.3 Discharge Monitoring

In accordance with the SFBRWQCB Order, the effluent discharge to Berryessa Creek will be monitored daily to verify that the discharge is not causing the following:

- Floating, suspended, or deposited macroscopic particulate matter or foam;
- Bottom deposits or aquatic growths to the extent that such deposits or growths cause nuisance or adversely affect beneficial uses;
- Alteration of temperature, turbidity, or apparent color beyond present natural background levels;
- Visible, floating, suspended, or deposited oil or other products of petroleum origin; and
- Toxic or other deleterious substances to be present in concentrations or quantities that will cause deleterious effects on aquatic biota, wildlife, or waterfowl, or which render any of these unfit for human consumption either at levels created in the receiving waters or as a result of biological concentration.

Additionally, standard observations for the groundwater treatment system will be recorded on each day and will include observations of: odor, weather condition (wind direction and estimated velocity), deposits, discolorations, and/or plugging in the treatment system, and operation of the float and/or pressure shutoff valves to prevent system overflow. Any non-compliance with RWQCB standards for discharge will be rectified prior to continuation of treatment/discharge operations.

7.2 Media Breakthrough Monitoring

The GAC vessels shall be sampled a minimum of weekly to monitor for potential breakthrough. A sample will be collected from sample port MID-001 weekly and analyzed for VOCs by EPA Method 8260B to monitor for potential GAC breakthrough. If VOCs are detected in the MID-001 sample at concentrations that exceed the maximum daily effluent limitations identified in Table 4 in the Tables Section following the report narrative (Column B: Discharge to Other Surface Water Areas) of the SFBRWQCB Order, another sample will be immediately collected and analyzed to confirm the breakthrough. If breakthrough is confirmed, the GAC in the lead vessel will be replaced (see Section 3.0), the original lag vessel will become the lead vessel, and the newly replaced GAC will become the lag vessel.

8.0 MEDIA CHANGE-OUT PROCEDURES

The treatment system will be shut down to replace the spent GAC in the lead vessel. The need to stop the groundwater diversion or extraction during the GAC change-out will be evaluated based on the following: the current available volume to store diverted/extracted water in the equalization tank and the GAC Contractor's time estimate to remove the spent GAC and emplace the new GAC. The above ground extraction water piping will be reconfigured so the former second GAC vessel (lag vessel) becomes the lead vessel and the vessel with the replaced GAC becomes the lag vessel (second in the series).

The GAC Contractor will remove the GAC from the lead vessel after the water has been drained from the vessel. The Contractor will remove the GAC using a vacuum hose, containerize the spent material, and fill the vessel with new GAC. The spent GAC will be profiled for disposal by submitting a sample for analysis of total VOCs and for the Toxicity Characteristic Leaching Procedure (TCLP) for VOCs. The GAC Contractor will remove the spent GAC from the project area and regenerate and/or dispose of the spent GAC appropriately, depending upon whether the profile results exceed hazardous waste thresholds. (Reuse of the GAC would be up to the GAC Contractor but in no instance would it be reused at the Project site.) Hazardous waste thresholds for the chemicals of concern associated with the AOI are presented in Table 4 in the Tables Section following the report narrative.

The EPA regulations establish two ways of identifying solid wastes as hazardous under the Resource Conservation and Recovery Act (RCRA). A waste may be considered hazardous if it exhibits certain hazardous properties ("characteristics") or if it is included on a specific list of wastes EPA has determined are hazardous ("listing" a waste as hazardous) because EPA found the characteristics to pose substantial present or potential hazards to human health or the environment. EPA defines four hazardous waste characteristic properties: ignitability, corrosivity, reactivity, or toxicity. A waste is ignitable if it is:

- a liquid with a flash point of less than 140 degrees F using an approved flash point test,
- a non-liquid that can readily catch fire under standard temperature and pressure, and burns vigorously after ignition so as to create a hazard, and
- is an ignitable compressed gas or a Department of Transportation oxidizer.

A waste is corrosive if it is:

- an aqueous waste with a pH of less than or equal to 2 or greater than or equal to 12.5, and
- a waste that can corrode steel at a rate of ¼ inch or more per year.

A material is a reactive hazardous waste if it is normally unstable, reacts violently with water, generates toxic gas if exposed to water or corrosive materials, or is capable of detonation if exposed to heat or flame.

A waste is determined to be hazardous based on the toxicity characteristic if a sample of the waste is subject to the TCLP for VOCs at a state-certified analytical laboratory and the results exceed the TCLP limits.

There are four different lists of hazardous wastes (40CFR 261), which are:

- **The F list (non-specific source wastes) –** contains waste from non-specific sources. This list includes solvents commonly used in degreasing, metal treatment baths and sludges, wastewaters from metal plating operations, and dioxin containing chemicals and their precursors.
- **The K list (source-specific wastes) –** designates particular solid wastes from certain specific industries. This listing includes descriptions that are very specific and clear such as wood preservation, pigment production, chemical production, petroleum refining, iron and steel production, explosive manufacturing, and pesticide manufacturing.
- **The P list and the U list (discarded commercial chemical products) –** contain discarded commercial products, off-spec chemicals, contain residues, and residues from chemical spills. The main differences between the two lists are the quantities of chemicals regulated.

It is the generator's responsibility to determine if the waste is a listed waste. The EPA defines a generator as "any person, by site, whose act or process produces hazardous waste identified or listed in part 261 of Title 40 of the Code of Federal Regulations (CFR)".

8.1 Hazardous Waste Disposal Site

Hazardous and non-hazardous waste will be disposed of in accordance with federal, state, and local regulations; the disposal facility will be selected by the contractor, subject to client approval.

9.0 REPORTING

Any non-compliance releases and spills that may endanger health or the environment must be reported to the National Response Center (NRC)[1] as well as the SFBRWQCB, the Project Engineer, and the Santa Clara Valley Water District within 24 hours of becoming aware of the circumstance. A written submission of the non-compliance, if any, shall be uploaded to GeoTracker within five days of becoming aware of the circumstance.

All analytical results from the AOI will be submitted to the SFBRWQCB within 24 hours of receipt and uploaded to GeoTracker within five days.

10.0 DEMOBILIZATION

The Construction Contractor will prepare a Rain Action Event Plan (REAP) meeting guidelines of the California Stormwater Quality Association best management practices for construction activities. The REAP will include detailed directions for removing equipment and materials from the channel if substantial rain is forecast. As noted in Section 6.0, the Construction Contractor shall have sufficient cranes, forklifts,

[1] The NRC is the sole federal point of contact for reporting all hazardous substance spills and releases, including the VOCs found in the AOI. See their website for more information (http://www.nrc.uscg.mil/nrcrpttxt.htm. See also the reportable quantities promulgated by 40 CFR Part 302.4 and found in Table 302.4 of the following website: https://www.gpo.gov/fdsys/pkg/CFR-2011-title40-vol28/pdf/CFR-2011-title40-vol28-sec302-4.pdf

trucks, and personnel onsite while working within the AOI to remove all equipment associated with the temporary groundwater treatment plant within 24 hours of notification of a pending rain event.

Prior to removing the treatment equipment from the Site, The sand filter media, organoclay from the organoclay filter, bag-filter sediment, and GAC from both the lead and lag vessels shall be sampled and analyzed by a state-certified laboratory for total VOCs and TCLP for VOCs for profiling purposes, as required prior to disposal at receiving facilities. The waste classification shall be determined based on the laboratory analytical results federal, state, and local regulations as described in Section 8.0. Hazardous waste thresholds for the chemicals of concern associated with the AOI are presented in Table 4.

Following the waste classification, the sand filter media, organoclay from the organoclay filter, bag-filter sediment, and GAC shall be removed from the respective vessels and transported offsite for lawful disposal. The GAC will be removed and either (1) regenerated and reused, or (2) disposed of off-site, depending whether the profiling results exceed hazardous waste thresholds.

Once the media have been removed, the piping of the components of the portable treatment plant will be disconnected and the individual components will be removed from the site using cranes, forklifts, and/or trucks, as appropriate. The aboveground components of the groundwater conveyance system and the connections to the portable treatment system will be reused by the Construction Contractor or disposed of as inert waste.

As mentioned in Section 4.0, if dewatering wells are installed to lower the water table as discussed in Section 5.0, the Construction Contractor will obtain all appropriate permits which can include permits and/or authorization from the Santa Clara Valley Water District for abandonment of the wells.

11.0 HEALTH AND SAFETY OVERVIEW

The dewatering contractor and the contractor performing the groundwater extraction and treatment system operation and monitoring will be required to be Hazardous Waste Operations and Emergency Response (HAZWOPER) trained (40-hour training with 8-hour annual updates), in compliance with 29 CFR 1910.120. The contractors are required to prepare their own Health and Safety Plan (HASP) with Job Safety Analyses (JSAs) for each task. At a minimum, the HASP will identify the following:

- Key personnel, general safety guidelines and protocols
- Job hazards
- Training requirements
- Personal protective equipment and engineering controls
- Exposure monitoring plan
- Emergency first aid and decontamination procedures
- Standard operating procedures

12.0 REFERENCES

Arcadis, 2015a. *Semiannual Groundwater Monitoring Report, August 1, 2014 through January 31, 2015, Former JCI Jones Chemical Facility, 985 Montague Expressway, Milpitas, California.* February 27, 2015.

Arcadis, 2015b. Semiannual Groundwater Monitoring Report, February 1, 2015 through July 31, 2015, Former JCI Jones Chemical Facility, 985 Montague Expressway, Milpitas, California. August 31, 2015.

SFBRWQCB, 2015. Letter from Bruce Wolfe to Amanda Cruz. *Berryessa Creek Channel Modification Project, adjacent to the former JCI Jones Chemical Facility, 985 Montague Expressway, Milpitas, Santa Clara County.* August 14, 2015.

Tetra Tech, 2015a. HTRW Soil Sampling Report Including Two Groundwater Grab Samples, Upper Berryessa Creek Flood Risk Management Project Between Montague Expressway and Yosemite Drive, Santa Clara County, Milpitas, California.

Tetra Tech, 2015b. Geotechnical Appendix. Upper Berryessa Creek Flood Risk Management Project I-680 to Calaveras Boulevard Santa Clara County, Milpitas, California. November 24, 2015.

TABLES

Table 1
Volatile Organic Compound in Area of Interest Groundwater
Berryessa Creek Widening Project Groundwater Management Plan

Constituent	**December 2014 & June 2015 Concentration Range (µg/L)**	**MCL (µg/L)**	**ESL (µg/L)**
Tetrachloroethylene	2.6 – 1,400	5	5
Trichloroethylene	0.6 – 86	5	5
Trans-1,2-dichloroethylene	0.6 – 16	10	10
Cis-1,2-dichloroethylene	<0.5 – 110	6	6
1,1-dichloroethane	<0.5 – 13	5	5
1,1-dichlorethene	<0.5 – 29	6	6
Vinyl Chloride	0.3 – 3.4	0.5	0.5

Notes:
ESL = Environmental Screening Levels
MCL = Maximum Containment Level
SFBRWQCB = San Francisco Bay Regional Water Quality Control Board
µg/L = micrograms per liter

Table 2
Extracted Groundwater Sampling Requirements
Berryessa Creek Widening Project Groundwater Management Plan

	Influent (INF-001)						Effluent (EFF-001)						
Parameter	**1st day**	**5th day**	**Monthly**	**Quarterly**	**Semiannually**	**Annually**	**1st day**	**5th day**	**Monthly**	**Quarterly**	**Semiannually**	**Annually**	**Once every 3 yrs**
Discharge Flow (gpm)							continuous	continuous	continuous	continuous	continuous	continuous	continuous
Fish Toxicity 96-hr % survival										x (1st yr)		x (after 1st yr)	
Standard Observations	x	x	x				x	x	x				
VOCs	x	x			x		x	x	x				
1,4-Dioxane								x			x		
Turbidity							x	x		x		x (after 1st yr)	
pH	x	x	x (1st yr)	x (2nd yr)		x (after 2nd yr)	x	x	x (1st yr)	x (2nd yr)		x (after 2nd yr)	
Total dissolved solids							x	x	x				
temperature							x	x	x (1st yr)	x (2nd yr)		x (after 2nd yr)	
Electrical conductivity							x	x	x (1st yr)	x (2nd yr)		x (after 2nd yr)	
Metals								x					x
Discharge Flow Volume									X				

Notes:
Standard Observation for Groundwater Treatment Systems include: odor; weather condition (wind direction and estimated velocity); deposits, discolorations, and/or plugging in the treatment system; operation of the float and/or pressure shutoff valves to prevent system overflow

Table 3
Groundwater Treatment Standards
Berryessa Creek Widening Project Groundwater Management Plan

Compound	CAS Number	Discharge to Other Surface Water Areas	
		Average Monthly Effluent Limitation (µg/L)	Maximum Daily Effluent Limitation (µg/L)
Benzene	71432	---	5
Carbon Tetrachloride	56235	4.4	5
Chloroform	67663	---	5
1,1-Dichloroethane	75343	---	5
1,2-Dichloroethane	107062	---	5
1,1-Dichloroethylene	75354	3.2	5
Ethylbenzene	100414	---	5
Methylene Chloride	75092	---	5
Tetrachloroethylene (PCE)	127184	---	5
Toluene	108883	---	5
Cis 1,2-Dichloroethylene	156592	---	5
Trans 1,2- Dichloroethylene	156605	---	5
1,1,1-Trichloroethane	71556	---	5
1,1,2-Trichloroethane	79005	---	5
Trichloroethylene (TCE)	79016	---	5
Vinyl Chloride	75014	---	1
Total Xylenes	1330207	---	5
Methyl Tertiary Butyl Ether (MTBE)	1634044	---	5
Total Petroleum Hydrocarbons [TPHs (as gasoline or as diesel)]	---	---	50
Ethylene Dibromide (1,2-Dibromoethane)	106934	---	5
Trichloro- trifluoroethane	76131	---	5
Total Chlorine Residual	---	---	0.0[1]

Notes:
µg/L = micrograms per liter

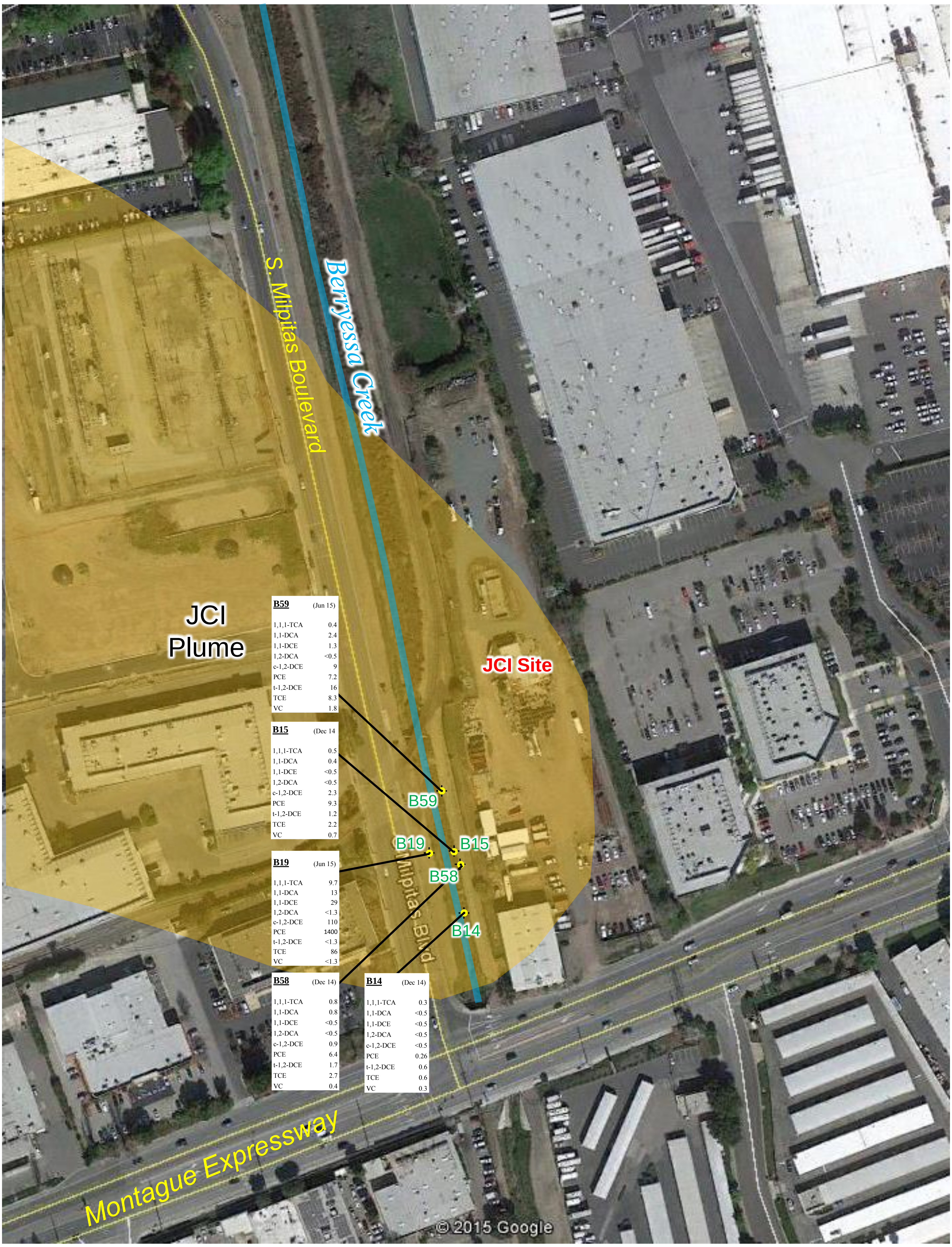
[1] = There shall be no detectable levels of residual chlorine in the effluent (a non-detect result using a detection level equal or less than 0.08 milligram per liter (mg/L) will not be deemed to be out of compliance). This limit only applies to Dischargers that chlorinate their extracted groundwater.

Table 4
Hazardous Thresholds for Granular Activated Carbon
Berryessa Creek Widening Project Groundwater Management Plan

Volatile Organic Compound	Regulatory Level (mg/L)
Benzene	0.5
Carbon Tetrachloride	0.5
Chlorobenzene	100
Chloroform	6.0
1,4-Dichlorobenzene	7.5
1,2-Dichloroethane	0.5
1,1-Dichloroethylene	0.7
Tetrachloroethylene	0.7
Trichloroethylene	0.5
Vinyl Chloride	0.2

Notes:
mg/L = milligram per liter

FIGURES

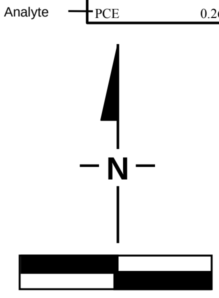


SOURCE: ***Google Earth Pro, February 23, 2014.***

B19 JCI shallow well (screened <40 feet bgs)

Approximate extent of JCI VOC Groundwater Plume

Location ID — **B14** (Dec 14) — Sample Date
Analyte — PCE 0.26 — Concentration (µg/L)



Abbreviations:

1,1,1-TCA	1,1,1-Trichloroethane
1,1-DCA	1,1-Dichloroethane
1,1-DCE	1,1-Dichloroethene
1,2-DCA	1,2-Dichloroethane
c-1,2-DCE	cis-1,2-Dichloroethene
PCE	Tetrachloroethene
t-1,2-DCE	trans-1,2 Dichloroethene
TCE	Trichloroethene
VC	Vinyl Chloride

TITLE:

JCI Shallow Groundwater Plume

LOCATION:

Upper Berryessa Creek FRMP
Between Montague Expressway and Yosemite Drive
Milpitas, California

TETRA TECH

CHECKED:	IA	FIGURE:
DRAFTED:	KDH	**1**
FILE:	100-SWW-T31331	
DATE:	10-15-15	

RCE: *Google Earth Pro, February 23, 2014.*

N

0 feet 75

Area of Interest

Approximate extent of JCI VOC Groundwater Plume

TITLE:

Area of Interest

LOCATION:

Upper Berryessa Creek FRMP
Between Montague Expressway and Yosemite Drive
Milpitas, California

TETRA TECH

CHECKED:	IA	FIGURE:
DRAFTED:	KDH	2
FILE:	100-SWW-T31331	
DATE:	10-15-15	

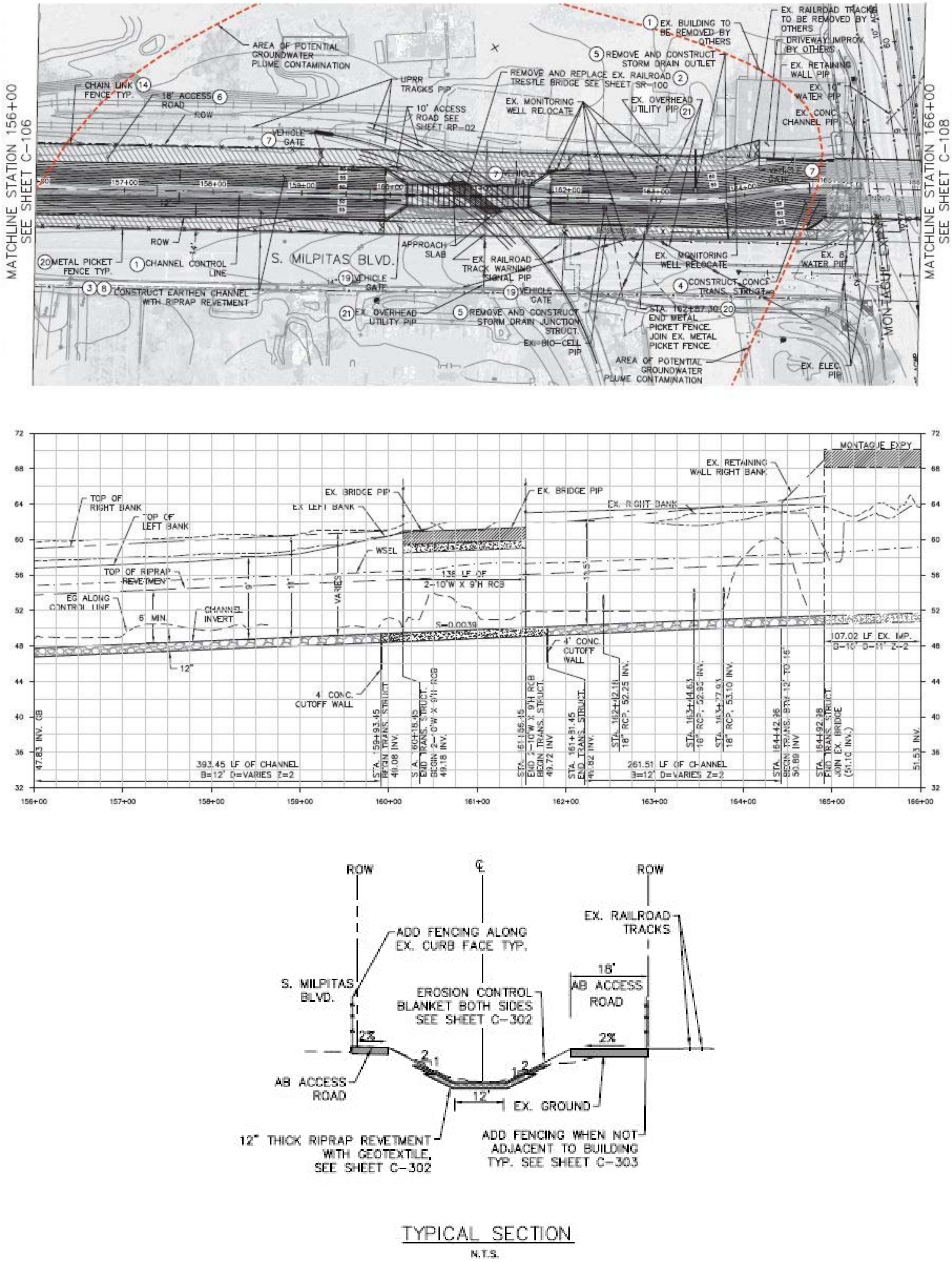
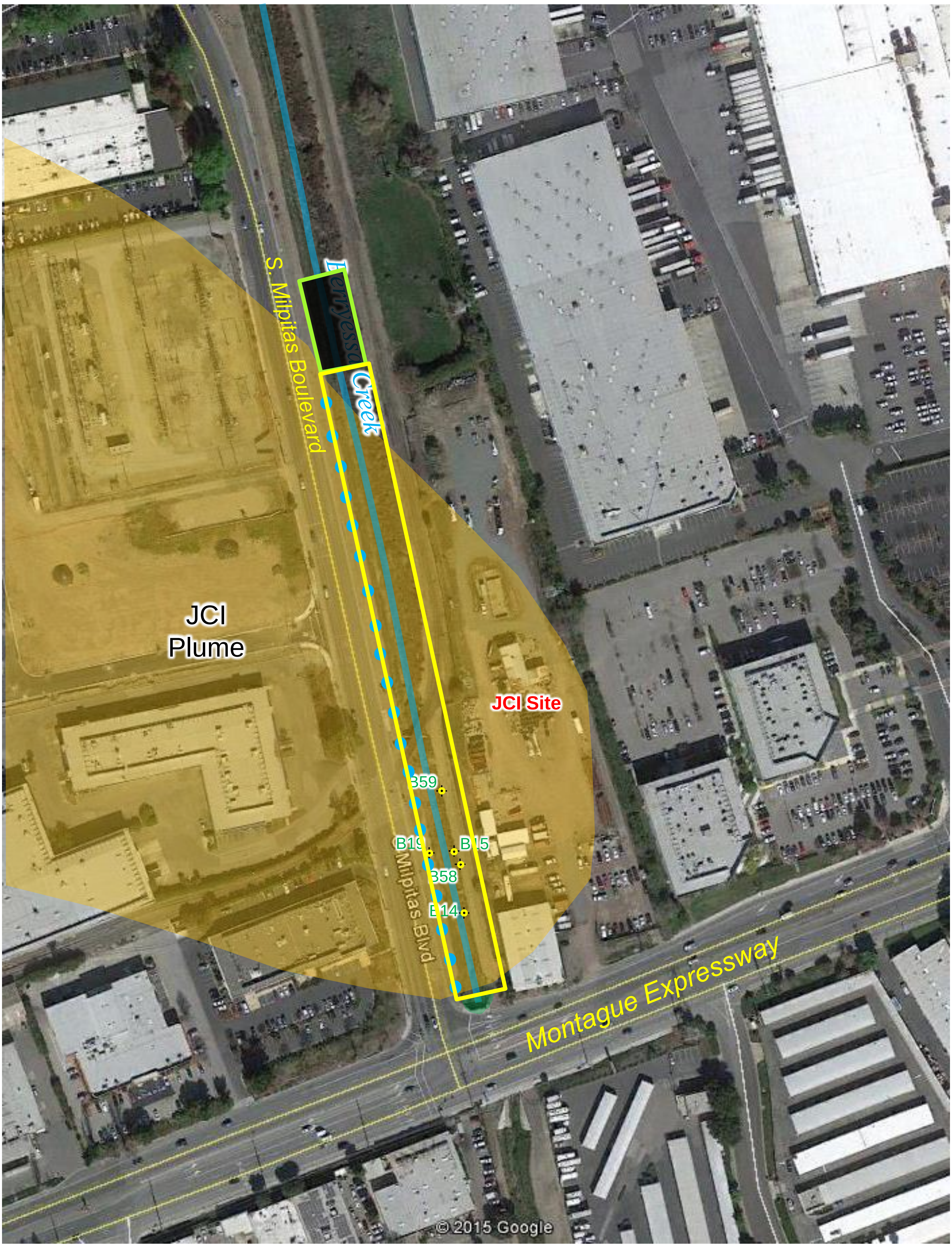


FIGURE 3. Proposed Project Construction Plans and Cross Section in the AOI



SOURCE: ***Google Earth Pro, February 23, 2014.***

Approximate location of shallow groundwater extraction well

B19 JCI shallow well (screened <40 feet bgs)

Approximate extent of JCI VOC Groundwater Plume

Area of Interest

Proposed Temporary Groundwater Treatment System Location

N

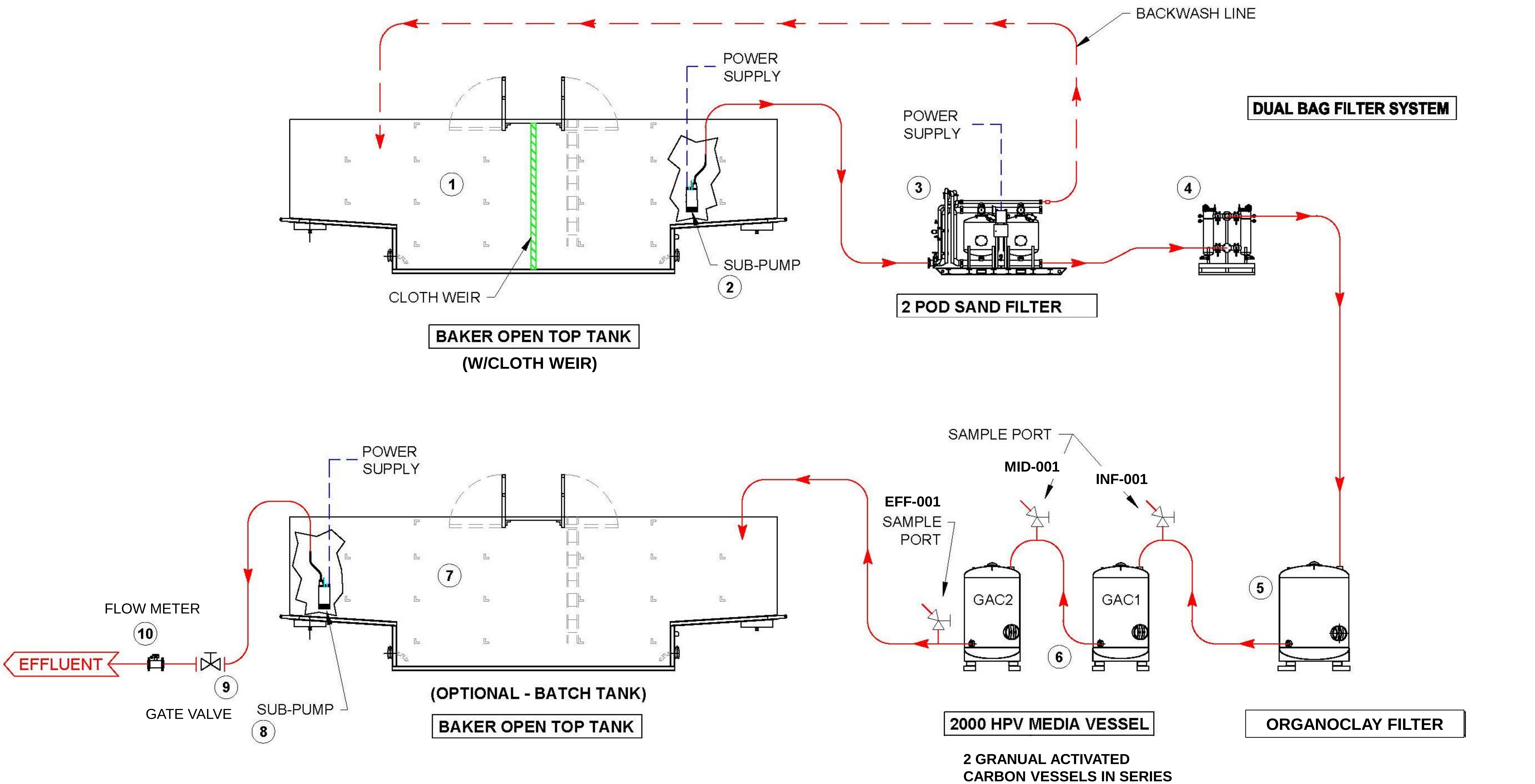
0 feet 150

TITLE: **Approximate Location of Shallow Groundwater Extraction Wells in AOI**

LOCATION: **Upper Berryessa Creek FRMP Between Montague Expressway and Yosemite Drive Milpitas, California**

TETRA TECH

CHECKED:	IA	FIGURE:
DRAFTED:	KDH	4
FILE:	100-SWW-T31331	
DATE:	10-15-15	



TITLE:	**Process Flow Schematic**
LOCATION:	**Upper Berryessa Creek FRMP** **Between Montague Expressway and Yosemite Drive** **Milpitas, California**

TETRA TECH

CHECKED:	SEP	FIGURE:
DRAFTED:	JAA	**5**
FILE:	100-SWW-T31331	
DATE:	10-30-15	

ATTACHMENTS

Attachment A
SFBRWQCB Non-Enforcement Letter Dated August 14, 2015

August 14, 2015
File No. 43S0065 (mej)

Amanda Cruz
San Francisco Planning Branch
US Army Corps of Engineers
1455 Market Street
San Francisco, CA
Amanda.B.Cruz@usace.army.mil

SUBJECT: Berryessa Creek Channel Modification Project, adjacent to the former JCI Jones Chemicals Facility, 985 Montague Expressway, Milpitas, Santa Clara County

Dear Ms. Cruz:

Thank you for meeting with Regional Water Board staff to discuss the upcoming creek channel modification project being conducted by the U.S. Army Corps. of Engineers and the Santa Clara Valley Water District. As we have discussed, the groundwater contaminant plume of volatile organic compounds (VOCs) originating from the former JCI Jones facility passes beneath passes beneath Berryessa Creek, immediately to the west of the former facility.

We understand that you will be working in the creek bed immediately adjacent to the former Jones site. As part of the construction, groundwater may be encountered. To manage groundwater that may be encountered during construction, a groundwater management plan will be developed that will include control and diversion of water, if necessary, using the most efficient means such as coffer dams, sump pumps, dewatering wells or other techniques. Any water that may be generated will be treated and discharged downstream or to a storm drain. The treatment standards for this discharge water will comply with those set forth in our NPDES General Permit (R2-2012-0012) for fuel and VOC impacted sites. However, you will not be obtaining an NPDES permit for this work. A copy of the groundwater management plan will be submitted to this agency for our review and comment.

Based on our understanding of the work outlined above and with the condition that the groundwater is treated to the standards described, we will not recommend enforcement for discharging without a permit.

The work in the creek bed will also include movement of soil/sediment as part of the construction activities. As discussed, there is no reason to believe shallow soil/sediment in the area adjacent to the former Jones facility is impacted. This being the case, no soil/sediment management plan is necessary for movement of the materials. In the case that impacted soil is encountered, it will be segregated and stockpiled for offsite disposal. We find this acceptable.

If you have any questions, please contact Mark Johnson of my staff at (510) 622-2493 [e-mail mjohnson@waterboards.ca.gov].

Sincerely,

[Original digitally signed and furnished upon request;
does not transfer as PDF copy]

Bruce H. Wolfe
Executive Officer

cc: Ira Artz, Ira.Artz@tetratech.com
Susan Glendening, susan.glendening@waterboards.ca.gov
Tim Gaffney, JCI Jones Chemicals, Inc. tgaffney@jcichem.com
Chuck Pardini, Arcadis Chuck.Pardini@arcadis-us.com

Attachment B
Photograph of Typical Temporary Groundwater Treatment Plant

Attachment C
Typical Specifications for a 100 Gallon Per Minute Temporary Groundwater Treatment Plant

PRODUCT DATA SHEET

January, 2007

2" DUPLEX BAG FILTER SYSTEM

GENERAL INFORMATION

Two independent filter housings are skid-mounted and piped such that one filter unit is active while the other is out of service. Inlet and outlet connections are provided on each end of the skid. Use for filtering a wide range of industrial and commercial process fluids, groundwater discharge from construction sites, stormwater or urban runoff.

WEIGHTS AND MEASURES

Capacity:	50 - 110 gpm per filter when clean (depends on filter media micron rating)
Design Pressure:	150 psi
Design Temp:	140°F max.*
Height:	4'-9" (overall)
Width :	4'-8"
Length:	5'-8"
Weight:	550 lbs. (approx.)

SKID DESIGN

Outer Frame:	6 x 8.2 A36 carbon steel channel
Inter. Frame:	2"x2 "x3/16" A36 carbon steel angle
Filter Housing Pad:	15 x 33.9 A36 carbon steel channel
Forklift Pockets:	Through front and rear framing channels
Cover:	Expanded metal grating
Lifting Eyes:	All four corners

*Practical limit for the PVC header piping. Unit could be used up to 225°F if carbon steel piping is used instead.

FILTER DESIGN

Filter Housing	Rosedale model 8-30-2F-2-150-C-B-S-PB
Top Cover:	Three eyenuts; hinged for easy access
Piping:	2" schedule 80 PVC (inlet and outlet headers)
Inlet & Outlet:	2" 150# ANSI flanges
Cover Seal:	Buna N (Nitrile) o-ring
Housing Material:	Carbon Steel
Filter Basket:	30" deep, 6.7" diameter, 4.4 sq. ft. surface area, 1000 cu. in. volume, 9/64" dia holes (51% open)
Filter Media:	Filter bags, size #2. Wide range of micron ratings is available, down to 1.0.
Vent Valves:	1/4" ball valve on top cover
Drain Valves:	1" ball valve on the bottom of each housing

SURFACE DETAILS

Exterior Coating:	High gloss polyurethane

TESTS / CERTIFICATIONS

Test Performed:	Scheduled QMS inspections

BAKERCORP™

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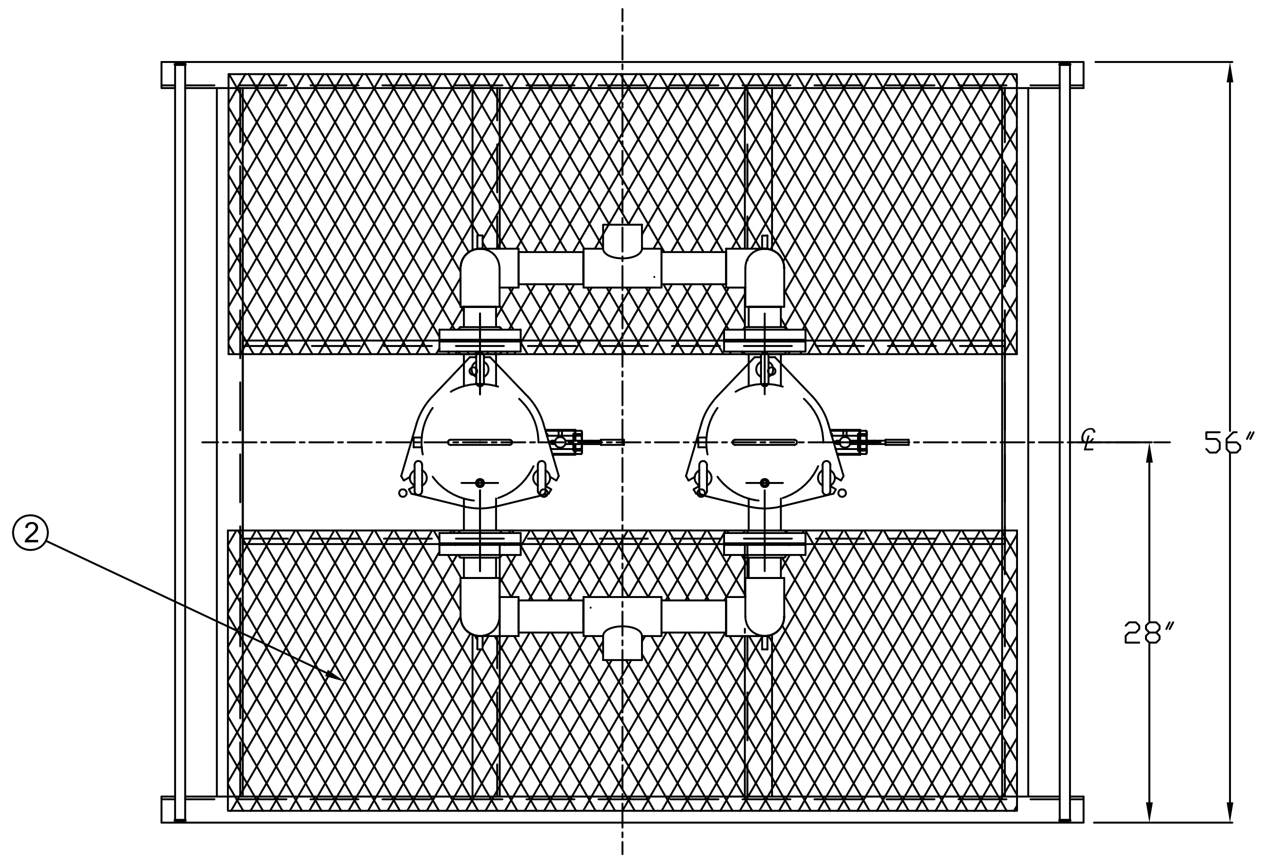
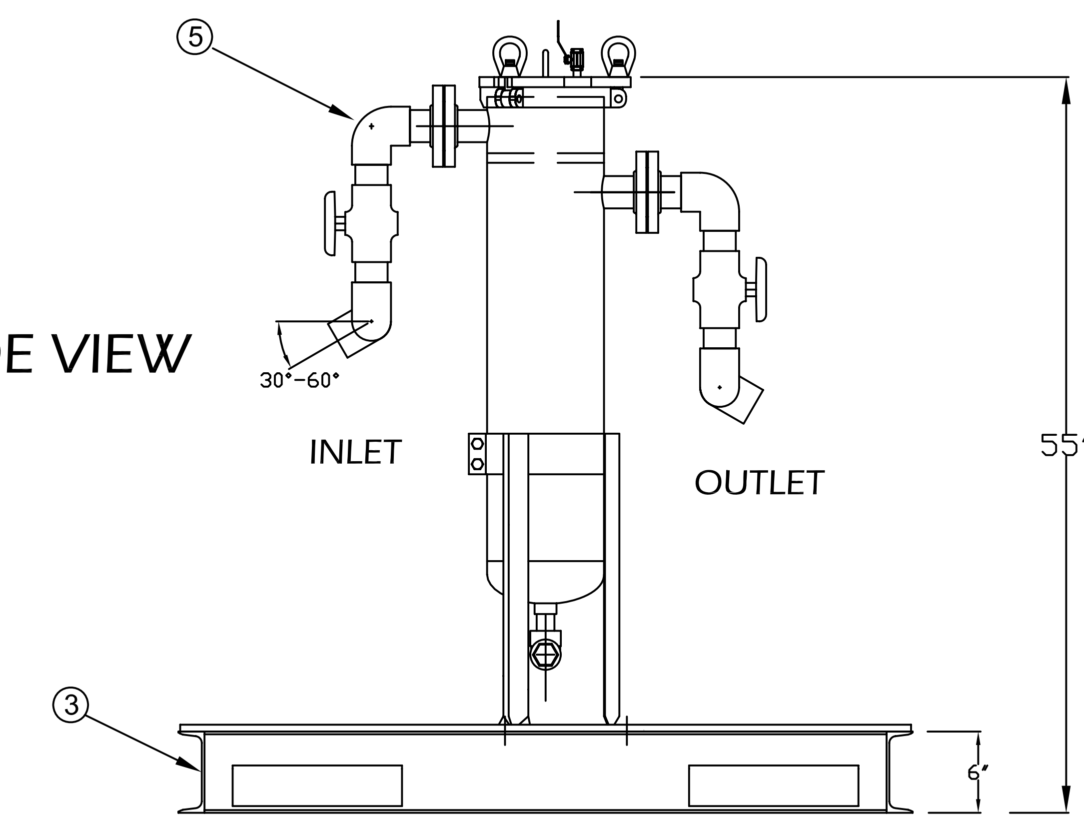
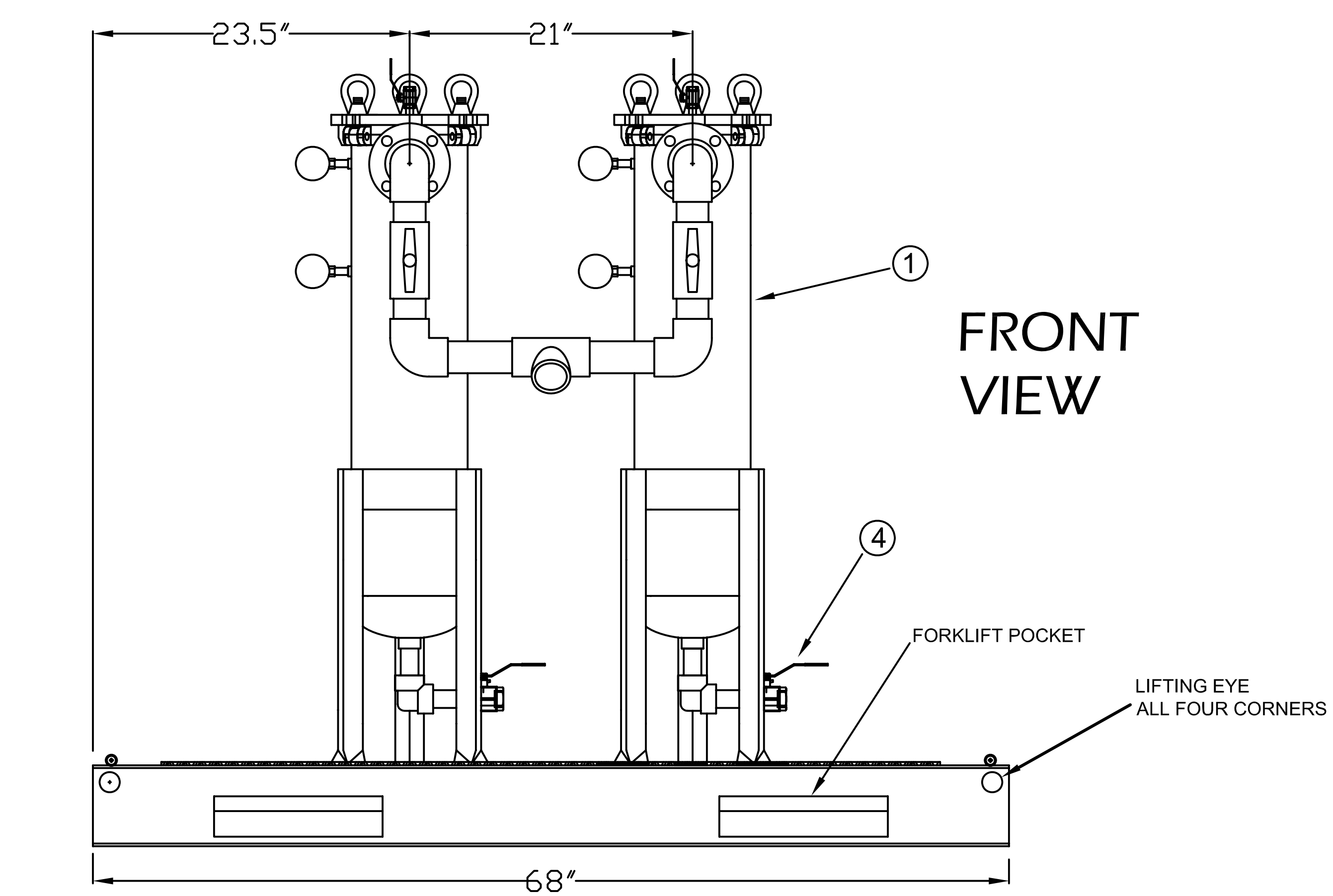
ITEM	DESCRIPTION
1	Rosedale Model 8302F2150CBS-PB Bag Filter, all welded construction, carbon steel wetted parts; Design Pressure: 150 psi; Design Temperature: 400°F; Filter Basket: 304 SS, 4.4 sq. ft. area, 9/64" dia. holes (51% open).
2	Expanded metal grating
3	Mounting skid with forklift pockets
4	1" bottom drain
5	2" PVC piping



TOP VIEW



SIDE VIEW



FRONT VIEW

BAKERCORP™ 3020 OLD RANCH PARKWAY SEAL BEACH, CA 90740-2751

REV.	DESCRIPTION	DATE	BY
G			
F			
E			
D			
C			
B			
A	Changed drawing title	2/18/05	PJB

SCALE: To Scale	SIZE B	ORIGINAL DWG. DATE 18AUG03
DRAWN BY: P.J.B.	APPROVED BY: –	CAT/CLASS ––
TITLE 2" BAG FILTER UNIT		SHEET 1 OF 1
DRAWING NO. S-9-M0010-1-		REV. A [redacted]

OC Organoclay/Carbon Blend

BakerCorp's OC series filtration media is available for liquid phase applications and is a blend of "R 8x30" activated carbon and "Z-200" modified zeolite (often referred to as organoclay). This carbon/organoclay mixture is ideal for the filtration of oil and grease from contaminated water. This media also has some catalytic abilities to adsorb anions such as chromate, selenate, sulfate, hydrocarbons (such as Benzene, Toluene, and Xylene), heavy metals (such as lead and cadmium), and various petroleum products (such as oil) from aqueous waste streams.

ORGANOCLAY PHYSICAL PROPERTIES:

Cation Exchange Capacity:	2.20 meq/g
Bulk Density (lbs./cu.ft.):	58
Hardness (Mohs Scale):	5.1
Pore Size:	4.0 A
Specific Surface Area:	40 sq. m/g
Thermal Stability:	1,202 F
Crushing Strength:	2,500 lbs/sq inch
Blended Bulk Density (lbs./cu. Ft.)	44

These specifications represent general parameters and are subject to change. Please consult with BakerCorp before proceeding with your application.

4306 W. 190th Street, Torrance, California 90504
Phone: 310.303.3700 ♦ Fax: 310.406.3001

PRODUCT DATA SHEET

January, 2007

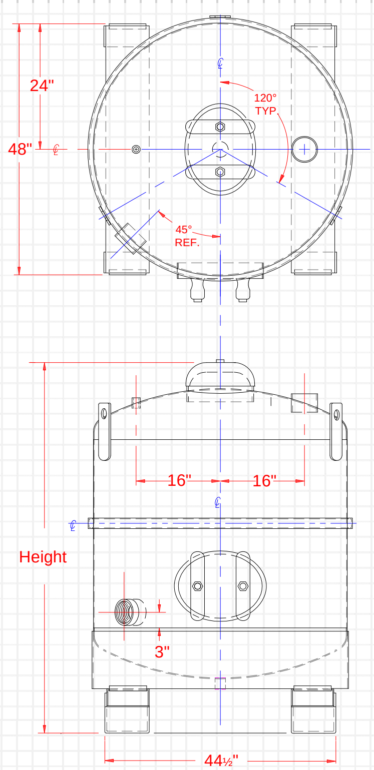
KLEEN.WATER 1000HPV & 2000HPV

GENERAL INFORMATION

These units are designed for the efficient purification of contaminated water or liquid streams. These filters have the ability to remove contaminants to non-detectable levels. The vessels are constructed of heavy-duty mild steel and are lined with a double-layer epoxy coating.

WEIGHTS AND MEASURES

» Max. Flowrate:	*1000HPV:* 80 gpm *2000HPV:* 100 gpm
» Max. Pressure:	75 psi
» Max. Temp:	150°F
» Height:	*1000HPV:* 70″ *2000HPV:* 96″
» Diameter:	48″
» Shipping Wt*: (drum + media) (*Media dependent)	1000HPV: 2050 lbs. – 3050 lbs. 2000HPV: 3100 lbs. – 5100 lbs.



Downflow operation is recommended

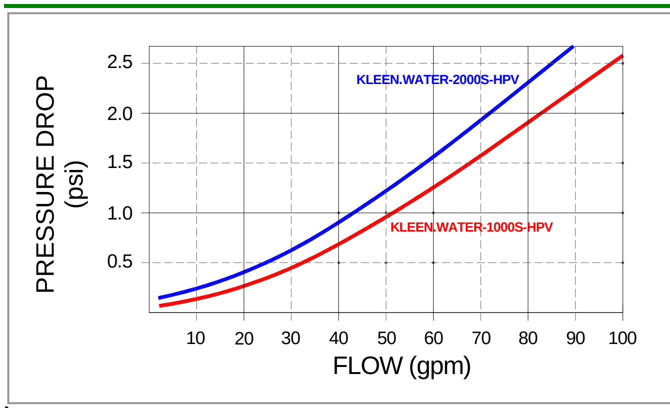
FILTER MEDIA

» Types:	•Activated Carbon •Organoclay •Ion Exchange Resin •Specialty Media
» Volume:	*1000HPV:* 34 cu. ft. *2000HPV:* 68 cu. ft.
» Weight*: (*Media dependent)	*1000HPV:* 1000 lbs. – 2000 lbs. *2000HPV:* 2000 lbs. – 4000 lbs.

MISCELLANEOUS

» Inlet:	4″ FNPT
» Outlet:	4″ FNPT
» Interior Coating:	Double-layered epoxy coating
» Internals:	PVC underdrain
» Media Access:	Top & side 12″x16″ manways (neoprene gaskets)

PRESSURE DROP DATA



NOTE:

1. Wet activated carbon preferentially removes oxygen from air. In closed or partially closed containers and vessels, oxygen depletion may reach hazardous levels. If workers are to enter a vessel containing carbon, appropriate procedures for potentially low oxygen spaces must be followed, including all federal and state requirements.

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TSURUMI PUMP | LB - SERIES | SPECIFICATIONS

SEMI-VORTEX - DEWATERING PUMP

FEATURES

1. Semi-vortex Urethane Rubber or high chrome cast iron impeller solids and allows for pumping of sand and stringy material.

2. Highly efficient, continuous duty air filled, copper wound motor with class E, insulation minimizes the cost of operation.

3. Built in thermal protection prevents motor failure due to overloading, accidental run-dry and single phasing in three phase units.

4. Double inside mechanical seals with silicon carbide faces running in an oil filled chamber provide for one the most durable seal designs available.

5. Double shielded, permanently lubricated, high temperature C3 ball bearings rated for a B-10 life of 60,000 hours provide for extended operational life.

6. Model LB-480A & LB-800A Automatic Submersible pump performs like the non-automatic version in every aspect of construction site usage requiring a tough and durable pump

7. Slime design allows pumps fit Into 8" pipes. (Manual type only)

APPLICATIONS

1. Residential, commercial, industrial wastewater and site drainage.

2. Decorative waterfalls and fountains.

3. Raw water supply from lakes or rivers.

4. Sediment removal from small sumps or basins.

Intertek

EQUIPPED

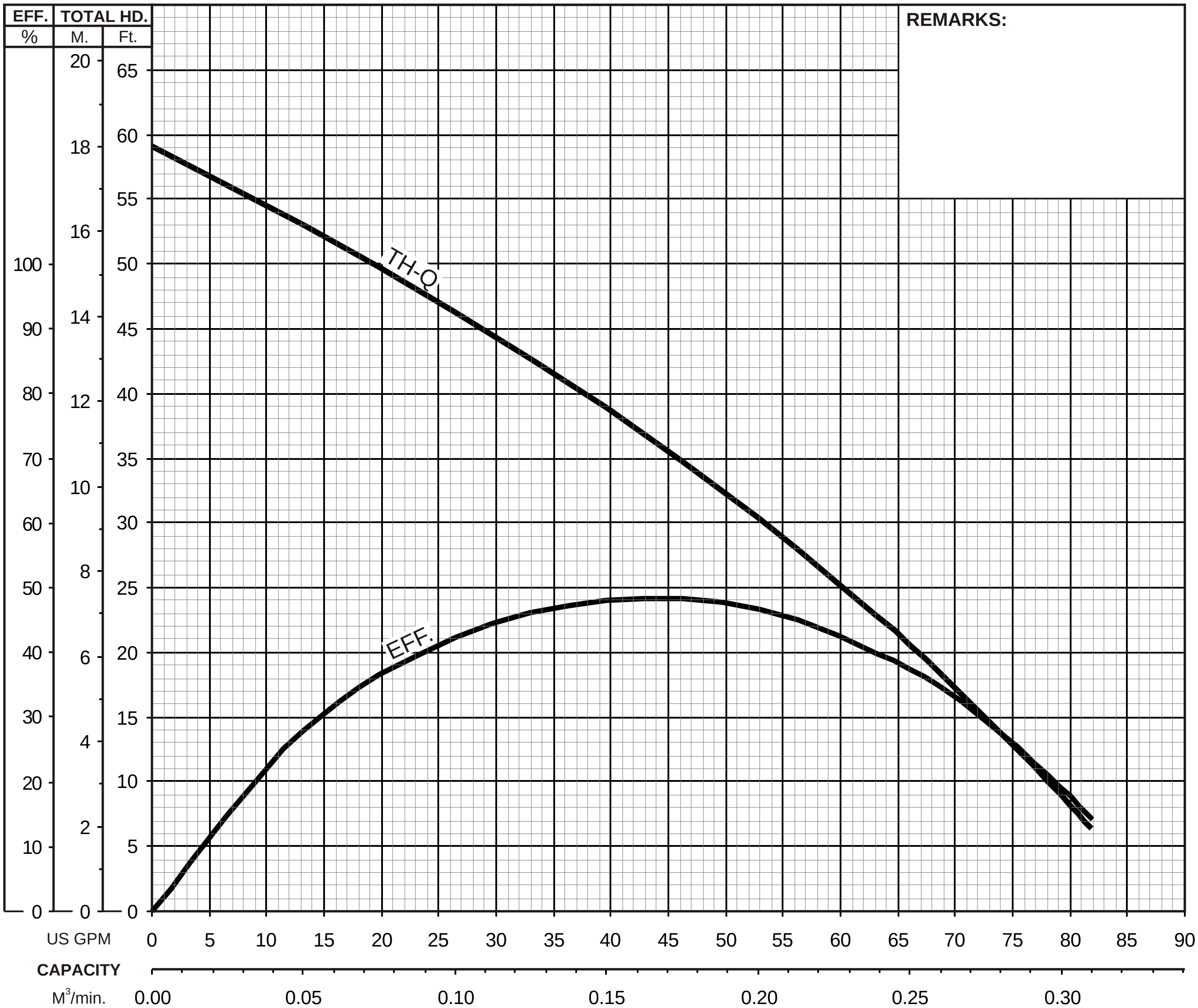
SPECIFICATIONS	STANDARD	OPTIONS
Discharge Size	2 - 3 "Npt (50 - 80 mm)	
Horsepower Range	1/2 - 2Hp. (0.40 - 1.5kW)	
Performance Range Capacity	15.9 - 111.0 GPM. (0.06 - 0.42 m^3/min)	
Head	13.1 Ft. - 68.9 Ft. (4.0 - 18.9 m)	
Maximum water temperature	104° F. (40° C.)	
Materials of Construction		
Casing	Butadiene Rubber + Natural Rubber + Steel [LB(T)-1500]	
Impeller	Urethane Rubber , High Chrome Cast Iron [LB(T)-1500]	
Shaft	403 Stainless Steel	
Motor Frame	Aluminum alloy	
Fasteners	304 Stainless Steel	
Mechanical Seal	Silicon Carbide	
Elastomers	NBR (Nitrile Butadiene Rubber)	
Impeller Type	Semi-vortex, solids handling.	
Solids Handling Capability	0.236" (6.0mm)	
Bearings	Prelubricated, Double Shielded	
Motor Nomenclature		
Type, Speed, Hz.	Air Filled, 3600 Rpm, 60 Hz.	
Voltage, Phase	115 / 230V., 1 Phase 230 / 460 / 575V., 3 Phase	
Insulation	Class E, B	
Accessories	Submersible Power Cable 32 - 50' (10 - 15m)	Length as Required, TS-301 Float Switch
Operational Mode	Manual , Automatic(LB-480A / 800A)	

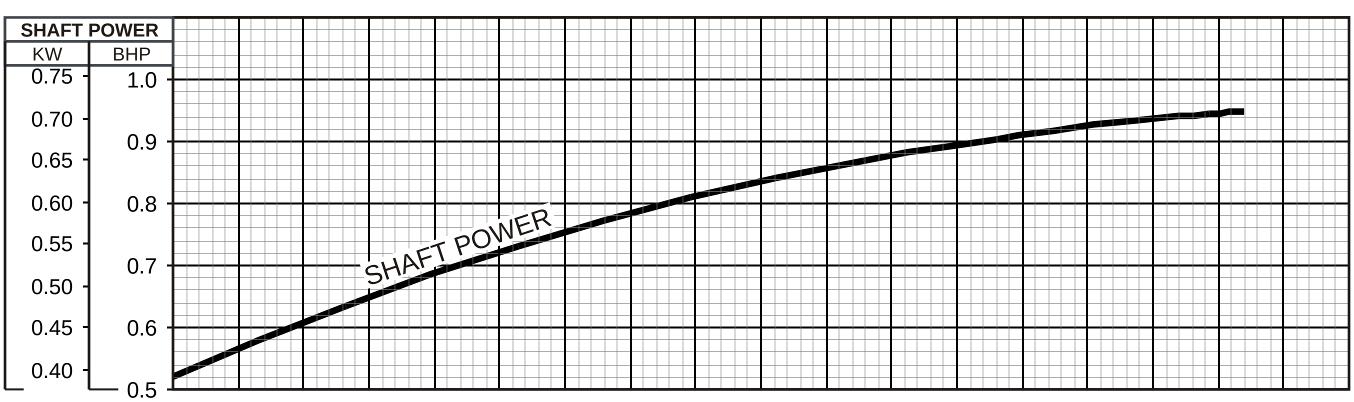
TSURUMI PUMP

LB - SERIES
SEMI-VORTEX - DEWATERING PUMP

PERFORMANCE CURVE

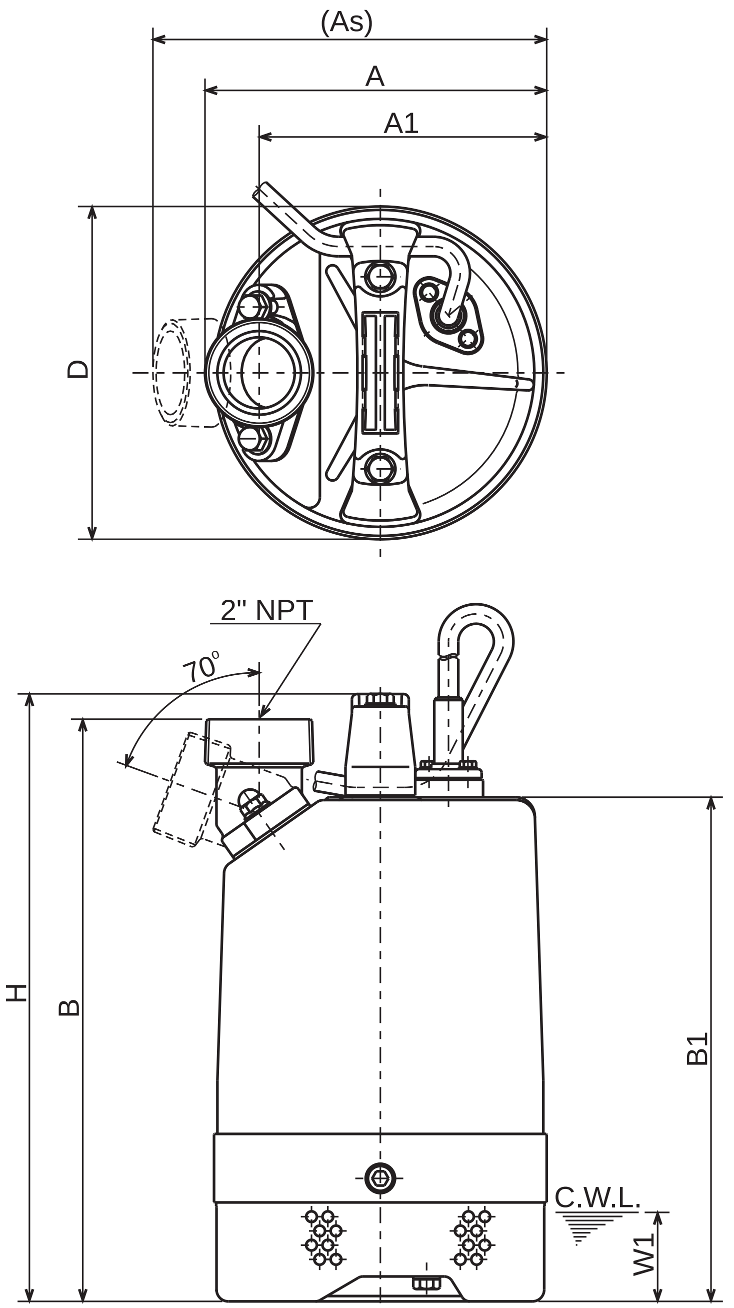
MODEL		BORE	HP	KW	RPM	SOLIDS DIA	LIQUID	SG.	VISCOSITY	TEMP.
LB(Z)-800(A)-61		2"/50mm	1	0.75	3300	0.236"/6mm	Water	1.0	1.123 cSt.	60°F
PUMP TYPE		PHASE	VOLTAGE		AMPERAGE		HZ	STARTING METHOD		INS. CLASS
Semi-Vortex - Dewatering Pump		Single	115-120 / 230		9.6-9.2 / 5.1		60	Capacitor Start		E
CURVE No.	DATE	PHASE	VOLTAGE		AMPERAGE		HZ	STARTING METHOD		INS. CLASS
-	-	-	-		-		-	-		-





TSURUMI PUMP | **LB - SERIES** **SEMI-VORTEX - DEWATERING PUMP** | **DIMENSIONS**

LB-800-61
LBT-800-61



C.W.L. : Continuous running Water Level

DIMENSIONS:USCS (Inch)

Model	HP	NOM. SIZE	Pump & Motor							C.W.L.	Wt.
			A	As	A1	B	B1	D	H	W1	(lbs.)
LB-800-61	1	2"	7 9/16	8 11/16	6 3/8	12 7/8	11 1/8	7 3/8	13 7/16	2	29
LBT-800-61	1	2"	7 9/16	8 11/16	6 3/8	12 7/8	11 1/8	7 3/8	13 7/16	2	28

DIMENSIONS:METRIC (mm)

Model	kW	NOM. SIZE	Pump & Motor							C.W.L.	Wt.
			A	As	A1	B	B1	D	H	W1	(kg)
LB-800-61	0.75	50	192	221	162	327	283	187	341	50	13.2
LBT-800-61	0.75	50	192	221	162	327	283	187	341	50	12.8

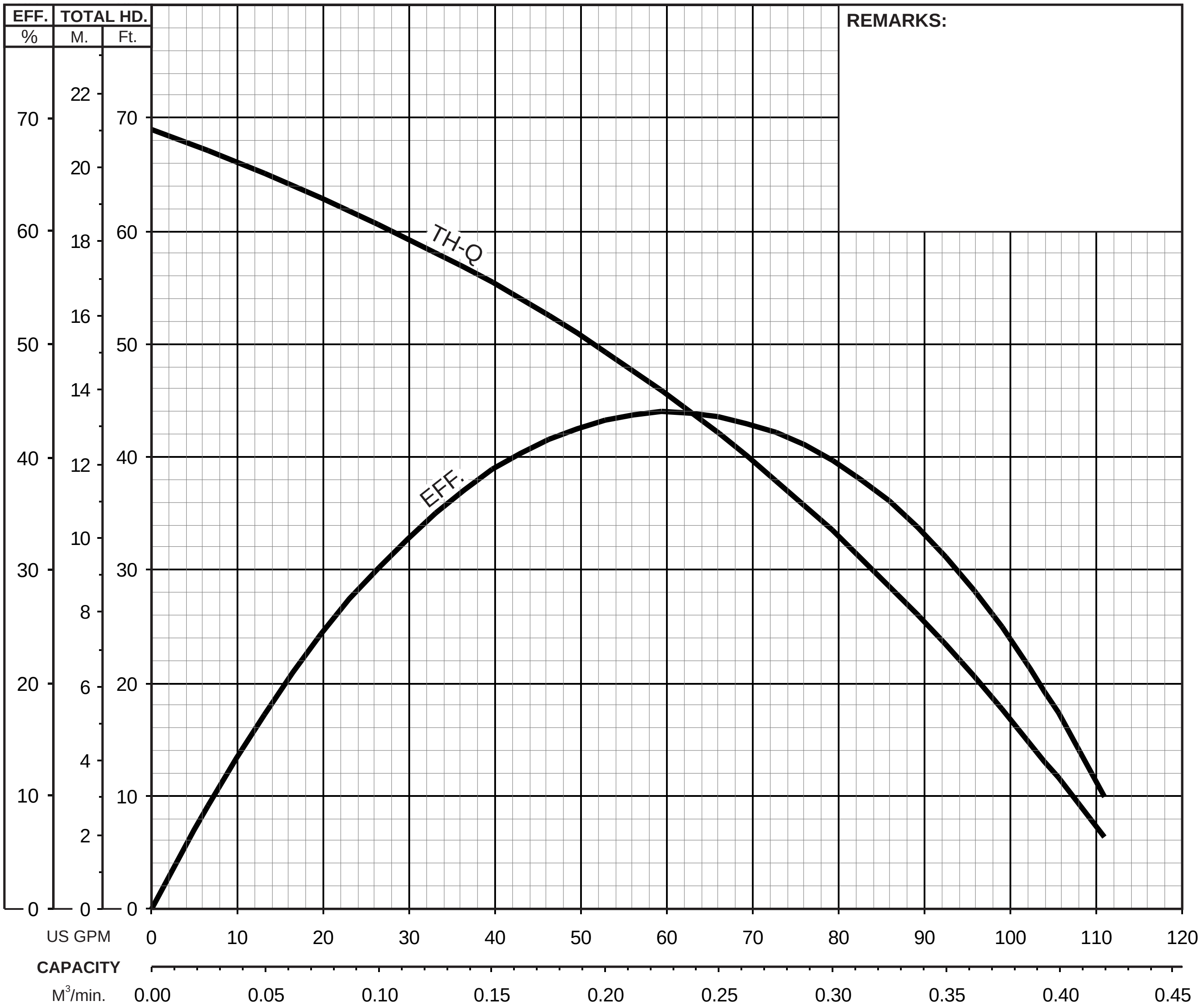
TSURUMI PUMP

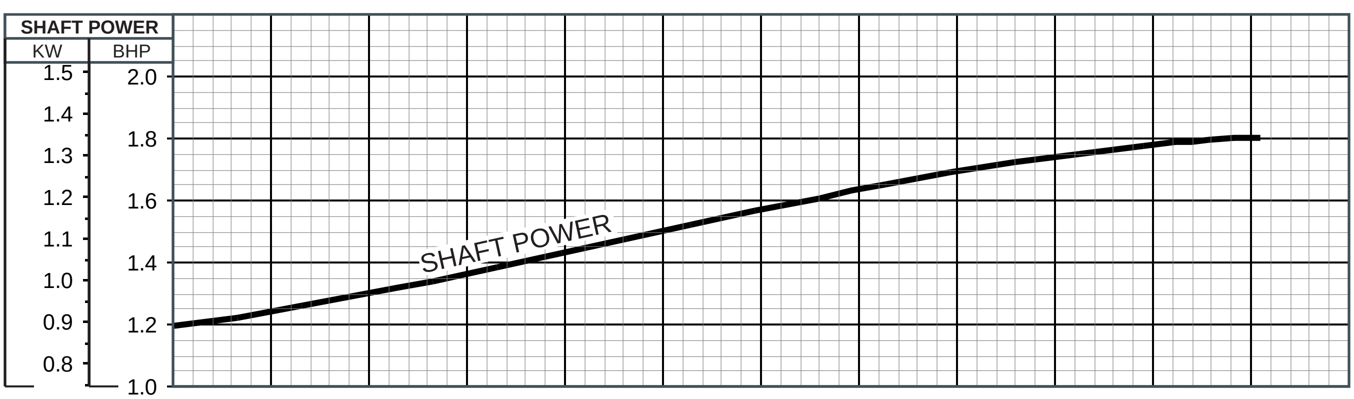
LB - SERIES
SEMI-VORTEX - DEWATERING PUMP

PERFORMANCE CURVE

MODEL		BORE	HP	KW	RPM	SOLIDS DIA	LIQUID	SG.	VISCOSITY	TEMP.
LB-1500-60		3"/80mm	2	1.5	3480	0.236"/6mm	Water	1.0	1.123 cSt.	60°F
PUMP TYPE		PHASE	VOLTAGE		AMPERAGE	HZ	STARTING METHOD		INS. CLASS	
Semi-Vortex Dewatering Pump		Single	110/115/120, 230		27.1/26.2/27.0, 13.2	60	Capacitor Start		B	
CURVE No.	DATE	PHASE	VOLTAGE		AMPERAGE	HZ	STARTING METHOD		INS. CLASS	
-	-	-	-		-	-	-		-	

REMARKS:



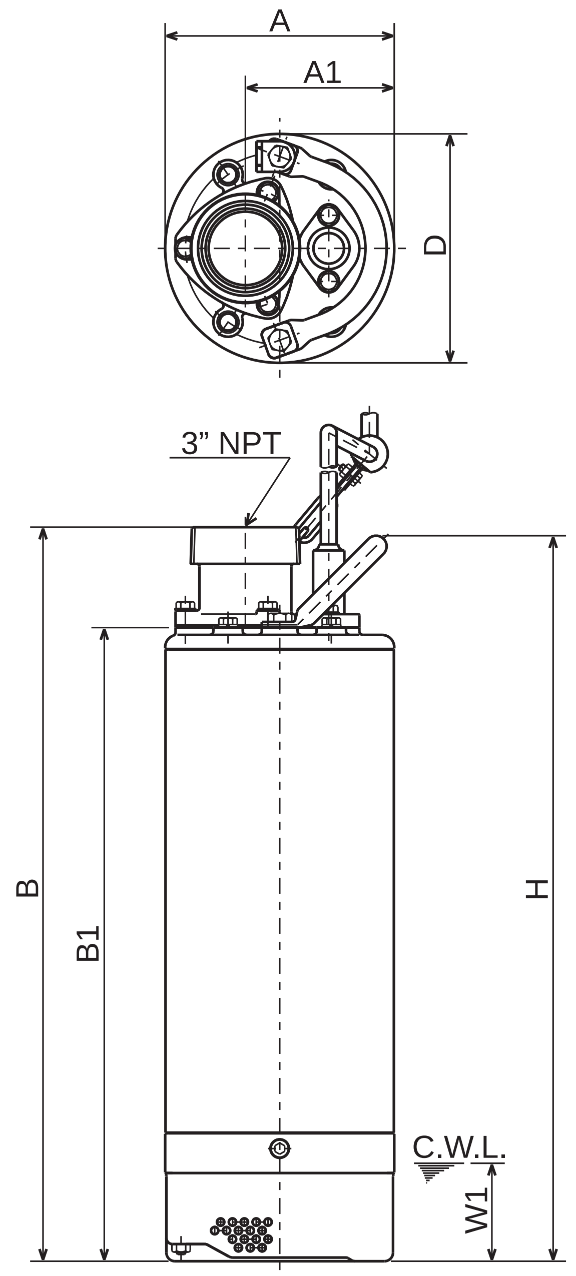


TSURUMI PUMP

LB - SERIES
SEMI-VORTEX - DEWATERING PUMP

DIMENSIONS

LB-1500-60
LBT-1500-60



C.W.L. : Continuous running Water Level

DIMENSIONS:USCS (Inch)

Model	HP	NOM. SIZE	Pump & Motor A	A1	B	B1	D	H	C.W.L. W1	Wt. (lbs.)
LB-1500-60	2	3"	7 3/8	4 13/16	23 5/8	20 3/8	7 3/8	23 5/16	3 1/8	72
LBT-1500-60	2	3"	7 3/8	4 13/16	23 5/8	20 3/8	7 3/8	23 5/16	3 1/8	70

DIMENSIONS:METRIC (mm)

Model	kW	NOM. SIZE	Pump & Motor A	A1	B	B1	D	H	C.W.L. W1	Wt. (kg)
LB-1500-60	1.5	80	187	122	600	518	187	593	80	32.5
LBT-1500-60	1.5	80	187	122	600	518	187	593	80	32.0

TSURUMI PUMP

HS - SERIES
SEMI-VORTEX - WASTEWATER PUMP - WITH AGITATOR

SPECIFICATIONS

FEATURES

1. Semi-vortex Urethane Rubber impeller with agitator suspends solids and allows for pumping of sand and stringy material.

2. Highly efficient, continuous duty air filled, copper wound motor with class E, insulation minimizes the cost of operation.

3. Built in thermal protection prevents motor failure due to overloading, accidental run-dry and single phasing in three phase units.

4. Double inside mechanical seals with silicon carbide faces running in an oil filled chamber provide for one the most durable seal designs available.

5. Double shielded, permanently lubricated, high temperature C3 ball bearings rated for a B-10 life of 60,000 hours provide for extended operational life.

HSZ : HS series dewatering pump is available in an automatic Type with simple float switch.

HSD : Single Phase compact pump fit for use in slurry dewatering in foundation works.

APPLICATIONS

1. Residential, commercial, industrial wastewater and site drainage.

2. Decorative waterfalls and fountains.

3. Raw water supply from lakes or rivers.

4. Sediment removal from small sumps or basins.

Intertek

OIL LIFTER EQUIPPED

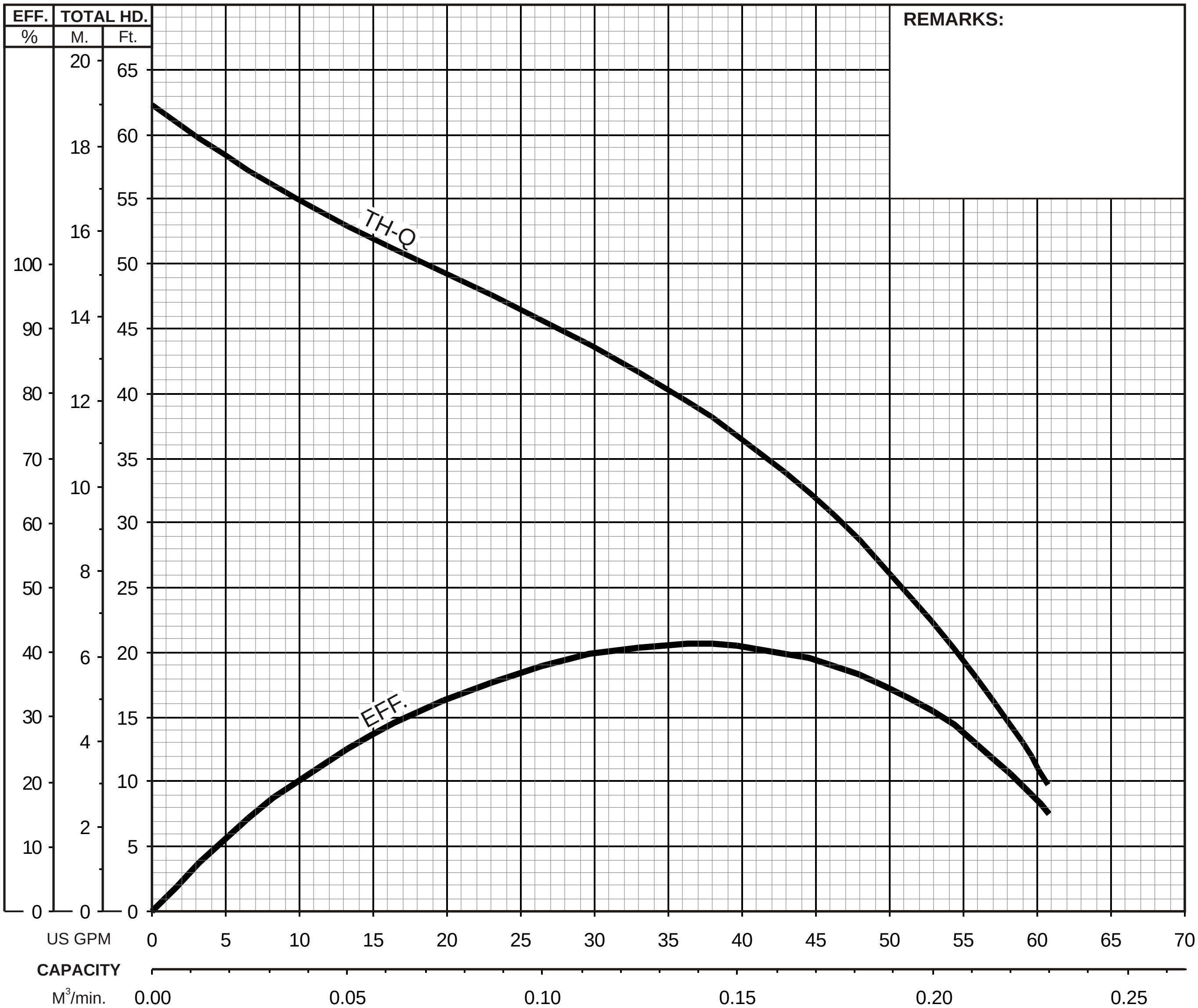
SPECIFICATIONS	STANDARD	OPTIONS
Discharge Size	2 - 3 "Npt (50 - 80 mm)	
Horsepower Range	1/2 - 1Hp. (0.40 - 0.75kW)	
Performance Range Capacity	13.2 - 61.0 GPM. (0.05 - 0.23 m^3/min)	
Head	13.1 Ft. - 62.0 Ft. (4.0 - 18.9 m)	
Maximum water temperature	104° F. (40° C.)	
Materials of Construction		
Casing	Cast Iron , Ductile Cast Iron(HSD)	
Impeller	Urethane Rubber , High Chrome Cast Iron(HSD)	
Shaft	403 Stainless Steel	
Motor Frame	Aluminum alloy	
Fasteners	304 Stainless Steel	
Mechanical Seal	Silicon Carbide	
Elastomers	NBR (Nitrile Butadiene Rubber)	
Impeller Type	Semi-vortex, solids handling.	
Solids Handling Capability	0.276 - 0.393" (7.0 - 10.0mm)	
Bearings	Prelubricated, Double Shielded	
Motor Nomenclature		
Type, Speed, Hz.	Air Filled, 3600 Rpm, 60 Hz.	
Voltage, Phase	115 / 230V., 1 Phase	
Insulation	Class E	
Accessories	Submersible Power Cable 20 - 32' (6.2 - 10m)	Length as Required,
Operational Mode	Manual , Automatic(HSZ)	TS-301 Float Switch

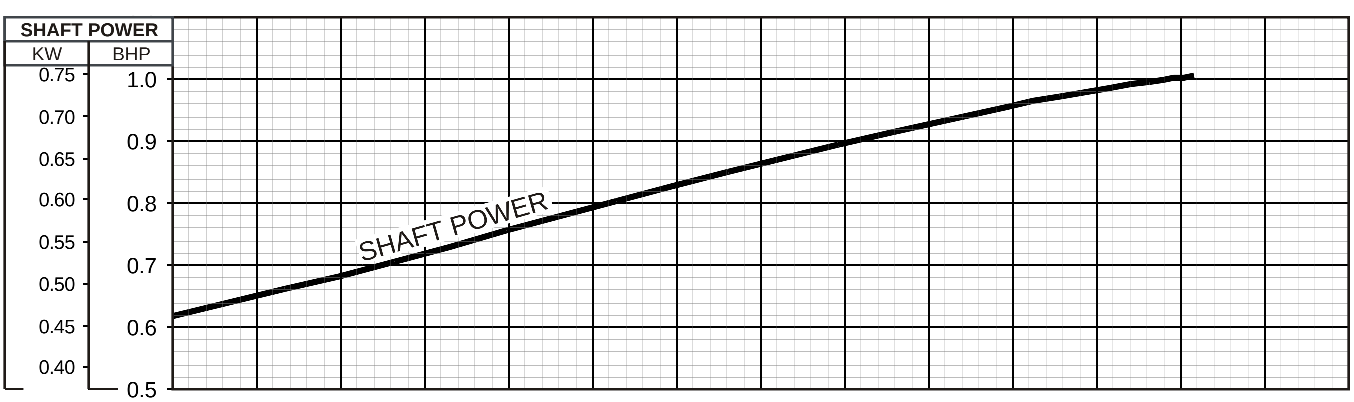
TSURUMI PUMP

HS - SERIES
SEMI-VORTEX - WASTEWATER PUMP

PERFORMANCE CURVE

MODEL		BORE	HP	KW	RPM	SOLIDS DIA	LIQUID	SG.	VISCOSITY	TEMP.
HS(Z)3.75S-61		3"/80mm	1	0.75	3408	0.276"/7.0mm	Water	1.0	1.123 cSt.	60°F
PUMP TYPE		PHASE	VOLTAGE		AMPERAGE	HZ	STARTING METHOD		INS. CLASS	
Semi-Vortex - Wastewater Pump		Single	110/115/120, 230		10.0 / 9.6 / 9.4 , 4.6	60	Capacitor Start		E	
CURVE No.	DATE	PHASE	VOLTAGE		AMPERAGE	HZ	STARTING METHOD		INS. CLASS	
-	-	-	-		-	-	-		-	

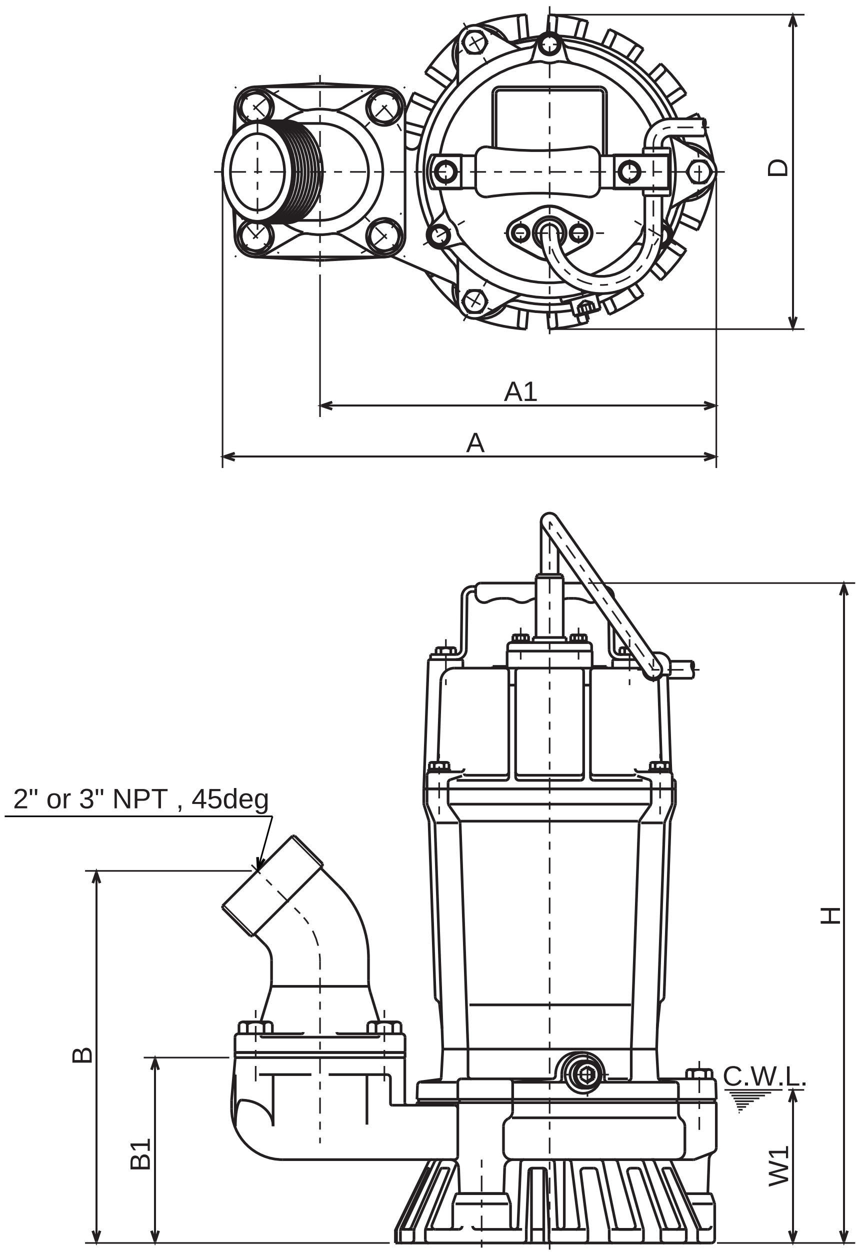




TSURUMI PUMP

HS - SERIES
SEMI-VORTEX - WASTEWATER PUMP

DIMENSIONS



C.W.L. : Continuous running Water Level

DIMENSIONS:USCS (Inch)

Model	HP	NOM.	Pump & Motor						C.W.L.	Wt.
		SIZE	A	A1	B	B1	D	H	W1	(lbs.)
HS2.75S-61	1	2"	11 7/16	9 3/16	8 5/8	4 5/16	7 5/16	15 1/4	3 1/2	40
HS3.75S-61	1	3"	12 7/16	9 3/16	9 1/2	4 5/16	7 5/16	15 1/4	3 1/2	42

DIMENSIONS:METRIC (mm)

Model	kW	NOM.	Pump & Motor						C.W.L.	Wt.
		SIZE	A	A1	B	B1	D	H	W1	(kg)
HS2.75S-61	0.75	50	290	233	219	109	185	388	90	18.2
HS3.75S-61	0.75	80	317	233	241	109	185	388	90	19.0

TSURUMI PUMP | NK - SERIES SEMI-VORTEX - DEWATERING PUMP | SPECIFICATIONS

FEATURES

1. Double inside mechanical seals with silicon carbide faces, running in an oil filled chamber and further protected by a lip seal running against a replaceable, stainless steel shaft sleeve, provides for the most durable seal design available.

2. Highly efficient, continuous duty air filled, copper wound motor with class B, insulation minimizes the cost of operation.

3. Built in thermal & amperage sensing, protector prevents motor failure due to overloading or accidental run dry conditions.

4. Double shielded, permanently lubricated, high temperature C3 ball bearings rated for a B-10 life of 60,000 hours, extend operational life.

5. Top discharge, flow-thru design enables operation at low water levels for extended periods.

Sand Kit : NK2-15SK / NK2-22SK
The Sand Kit can be added to the NK series to suspend sand and prevent sand lock.

APPLICATIONS

1. Residential, commercial, industrial wastewater and construction site drainage.

2. Effluent transfer.

3. Decorative waterfalls and fountains.

4. Raw water supply from rivers or lakes..

OIL LIFTER EQUIPPED

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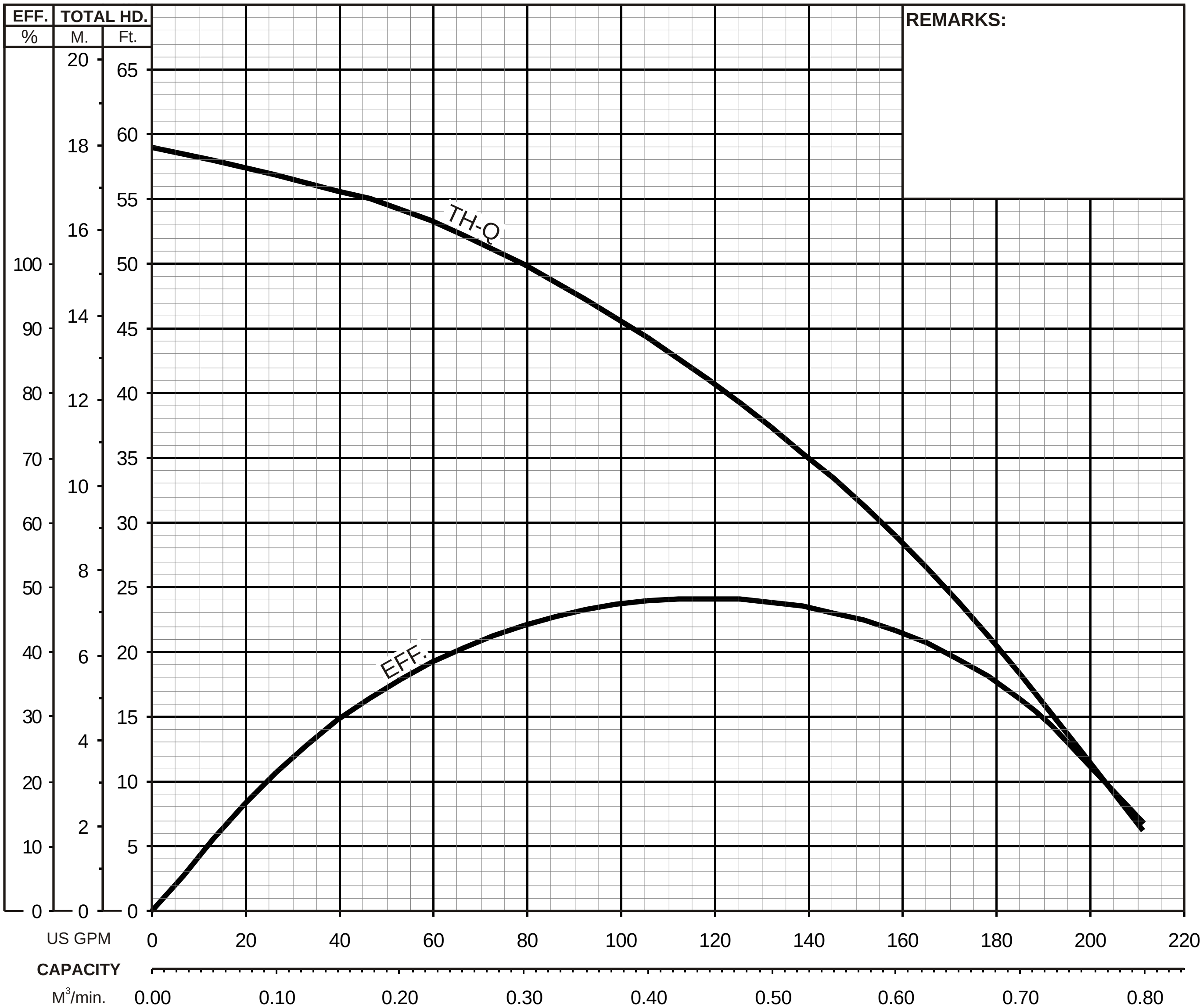
SPECIFICATIONS	STANDARD	OPTIONS
Discharge Size	3" Npt (80 mm)	
Horsepower Range	2 ~ 3 Hp. (1.5 ~ 2.2 kW)	
Performance Range Capacity	55.5 ~ 211.0 GPM. (0.21 ~ 0.80 m^3/min)	
Head	34.4 ~ 85.0 Ft. (10.50 ~ 25.91 m)	
Maximum water temperature	104° F. (40.0° C.)	
Materials of Construction		
Casing	Butadiene Rubber + Natural Rubber , Cast Iron (NK2-22L)	
Impeller	Ductile Cast Iron , High Chrome Cast Iron (NK2-22L , NK2-15SK/22SK)	
Shaft	420 , 403 Stainless Steel	
Motor Frame	Aluminum alloy	
Fasteners	304 Stainless Steel	
Mechanical Seal	Silicon Carbide	
Elastomers	NBR (Nitril Butadiene Rubber)	
Impeller Type	Semi-vortex, solids handling.	
Solids Handling Capability	0.334” (8.5mm)	
Bearings	Prelubricated, Double Shielded	
Motor Nomenclature		
Type, Speed, Hz.	Air Filled, 3600 Rpm, 60 Hz.	
Voltage, Phase	110/220 V., 1 Ph (NK2-15 Dual Voltage)	
Insulation	Class B	
Accessories	Submersible Power Cable 32' (10.0 m)	Length as Required
Operational Mode	Manual	TS-301 Float Switch

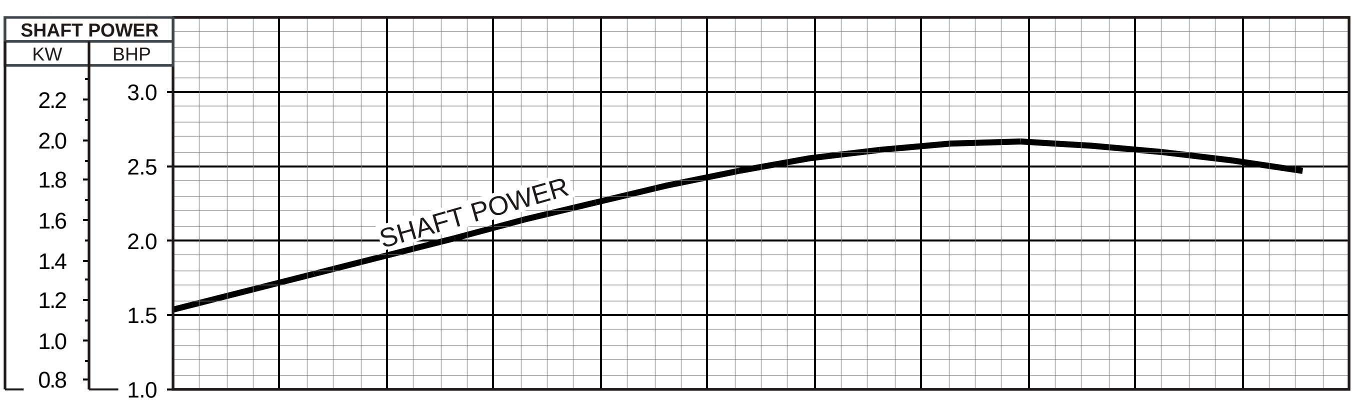
TSURUMI PUMP

NK - SERIES
SEMI-VORTEX - DEWATERING PUMPS

PERFORMANCE CURVE

MODEL		BORE	HP	KW	RPM	SOLIDS DIA	LIQUID	SG.	VISCOSITY	TEMP.
NK2-22L		3"/80mm	3	2.2	3465	0.334"/8.5mm	Water	1.0	1.123 cSt.	60°F
PUMP TYPE		**PHASE**	**VOLTAGE**		**AMPERAGE**	**HZ**	**STARTING METHOD**		**INS. CLASS**	
Semi-Vortex - Dewatering Pump		Single	220		13.0	60	Capacitor Start		B	
CURVE No.	**DATE**	**PHASE**	**VOLTAGE**		**AMPERAGE**	**HZ**	**STARTING METHOD**		**INS. CLASS**	
-	-	-	-		-	-	-		-	



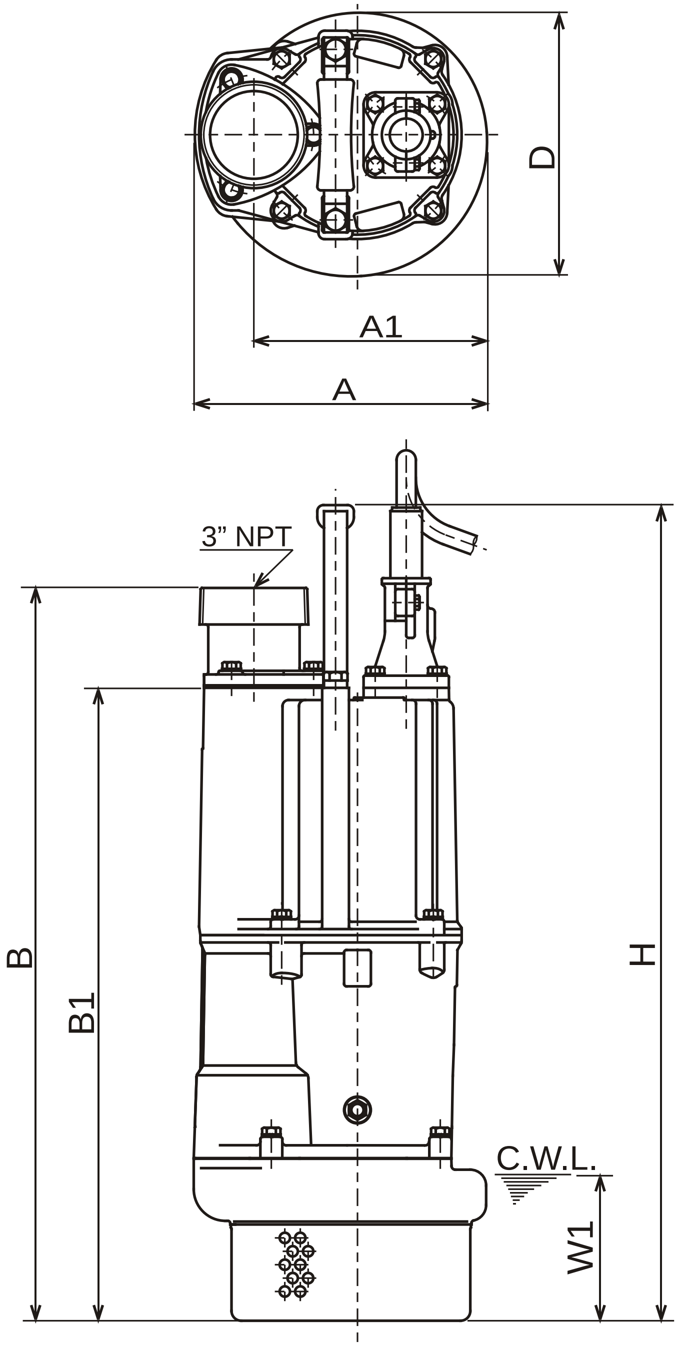


TSURUMI PUMP

NK - SERIES
SEMI-VORTEX - DEWATERING PUMPS

DIMENSIONS

NK2-22L



C.W.L. : Continuous running Water Level

DIMENSIONS:USCS (Inch)

Model	HP	NOM.	Pump & Motor						C.W.L.	Wt.
		SIZE	A	A1	B	B1	D	H	W1	(lbs.)
NK2-22L	3	3"	9 1/4	7 1/2	23 5/8	20 3/8	8 1/2	26 1/2	4 3/4	73

DIMENSIONS:METRIC (mm)

Model	kW	NOM.	Pump & Motor						C.W.L.	Wt.
		SIZE	A	A1	B	B1	D	H	W1	(kg)
NK2-22L	2.2	80	235	192	601	519	216	669	120	33.0

PRODUCT DATA SHEET

January, 2007

EZ CLEAN TANK

GENERAL INFORMATION

Vapor tight steel tank with two sealed top access hatches and pressure/vacuum relief valve. Smooth interior walls for easy cleaning.

WEIGHTS AND MEASURES

» Capacity:	500 BBL (21,000 gal.)
» Height:	12'-4"
» Width :	8'-0"
» Length:	37'-6" (40'-0" incl. stairway)
» Weight:	26,000 lbs.

STRUCTURAL DESIGN

» Floor:	¼" thick ASTM A36 carbon steel, "V" shaped bottom
» Sides/Ends:	¼" thick ASTM A36 carbon steel
» Roof Deck:	¼" thick ASTM A36 carbon steel
» Wall Frame:	4"x4" steel tubing (on exterior of wall surfaces)
» Floor Frame:	4"x4" steel tubing (on exterior of floor surface)
» Roof Frame:	4"x4" steel tubing (on exterior of roof surface)
» Internal Cross Bracing:	(3) - 2" sch. 80 pipes
» Skid Rails:	4" x 4" steel tubing

FEATURES

» Valves:	Typically 1-4" butterfly valve on front end and1-6" butterfly valve on rear end
» Relief Valve:	16 oz./in^2 pressure setting, 0.4 oz./in^2 vacuum setting; Buna-N seal
» Roof Piping Connection:	1-4" 150# flanged (blinded) connection, driver side on rear end
» Misc. Pipe Connections:	Typically 1-4" nipple with cap on front end below poop deck and 1-2" collar with plug on top deck

FEATURES – cont.

» Top Access Hatches:	2-30"x45" hinged vapor-proof hatches
» Hatch and Manway Seals:	Neoprene gasket
» End Manway:	1-20" diameter end hatch (front end)
» Exterior Stairway:	Rear end of tank – lower section folds for extension and retraction
» Guardrails:	Around top deck; fold-down
» Internal Ladder:	Nearest manhole to stairway
» Bottom Sump:	One on each end of tank, either flat bottomed, 12" diameter, 3" deep, or domed, 14" diameter, 4" deep
» Level Gauge:	Ball float style, 2-8" 304 SS floats
» Rear Wheels:	Removable dolly (not a fixed axle)

SURFACE DETAILS

» Exterior Coating:	High Gloss Polyurethane
» Interior Coating:	Chemical resistant coating (SS float balls are not coated)
» Safety Paint:	Safety yellow on all moveable safety equipment, handrails, stairs etc.

TESTS/CERTIFICATIONS

» Test Performed:	Major repairs – hydrotest Scheduled- Level I, II and III inspections, including NESHAP testing

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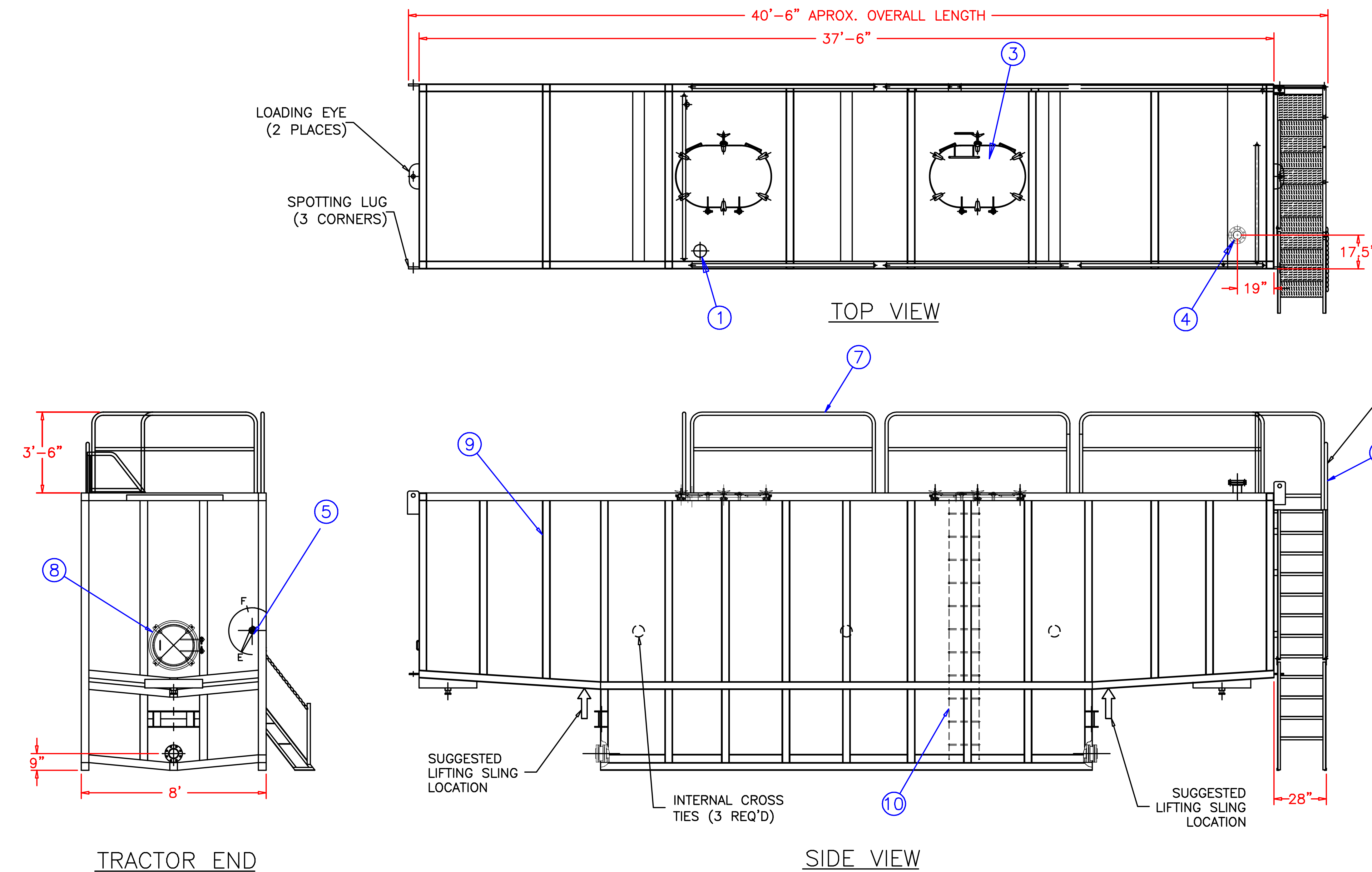
ITEM	QTY	DESCRIPTION
1	1	PRESSURE/VACUUM RELIEF VALVE
2	2	4" BUTTERFLY VALVE (SEE NOTE 1)
3	2	HINGED VAPOR PROOF HATCH
4	2	6" FLANGE WITH BLIND FLANGE (SEE NOTE 1)
5	1	LEVEL POINTER
6	1	OSHA COMPLIANT STAIRWAY & RAILS
7	1	OSHA COMPLIANT GUARD RAILS
8	1	20" END HATCH
9	1	4" x 4" STRUCTURAL TUBING FRAME, TYPICAL
10	1	INTERNAL LADDER



SPECIFICATIONS:
1) Tank Capacity: 21,000 gallons (500 BBL)
2) Tank Weight: 26,000 lbs. (empty)

NOTES:
1. This drawing is a baseline representation for this model of tank. Variations between this drawing and the actual equipment in the field can and do exist, primarily with appurtenance locations, sizes and quantities. Consult your local BakerCorp representative if specific needs exist.
2. THIS TANK IS *NOT DESIGNED FOR TRANSPORTING LIQUIDS*. It should be moved only when empty.
3. Tanks of this type have an internal lining (coating) on the wetted surfaces.
4. This tank is equipped with a pressure/vacuum relief valve set at 1.0 1bs/sq. in. pressure and 0.4 oz/sq.in. vacuum.

REV.	DESCRIPTION	DATE	BY
G			
F			
E			
D			
C			
B			
A	ADDED HIDDEN LINES / LIGHTENED HANDRAILES	7/12/05	Z.E.R

BAKERCORP™
3020 OLD RANCH PARKWAY
SEAL BEACH, CA 90740-2751

SCALE:	SIZE B	ORIGINAL DWG. DATE 25FEB02
DRAWN BY: A. R.	APPROVED BY: –	CAT/CLASS ––
TITLE EZ CLEAN VAPOR–TIGHT		SHEET 1 OF 1
DRAWING NO. S-1-M0007-1-		REV. A

BAKERCORP™

VCC 8x30 Virgin Coconut Shell Carbon

BakerCorp's VCC 8x30 mesh virgin carbon made from select grades of coconut shell. These activated carbon granules are a uniform adsorbent with well developed pore structure, allowing for a wide range of adsorbate retention. This carbon is ideal for purification of potable water, industrial wastewater treatment and groundwater treatment. This product is also suitable for refinement of organic liquids requiring purification and color reduction, such as amine and glycol solutions and will remove MTBE from groundwater.

PHYSICAL PROPERTIES:

Carbon Tetrachloride Activity:	60% minimum
Apparent Density (lbs./cu.ft.):	29 average
Total Ash Content:	3% maximum
Hardness (Ball Abrasion):	98% minimum
Iodine Number:	1,000 minimum
Moisture (as packed):	5% maximum
Mesh Size:	8x30

Standard Packaging: 1000 lb. super sacks. Other packaging available upon request.

These specifications represent general parameters and are subject to change. Please consult with BakerCorp before processing with your applications.

4306 W. 190th Street, Torrance, California 90504
Phone: 310.303.3700 ♦ Fax: 310.406.3001

PRODUCT DATA SHEET

April, 2007

3” 304 S.S. BAG / CARTRIDGE FILTER SYSTEM

GENERAL INFORMATION

Two parallel-piped bag filters are followed by a single cartridge filter (can be converted to hold a single #2 bag instead) and are mounted on a forkliftable skid. Housings are not ASME code stamped. Different bag and cartridge elements are available depending on job requirements and should be specified by the customer prior to use.

WEIGHTS AND MEASURES

» Capacity*:	100 gpm (2 bag/ 1 cartridge) 200 gpm (3 bags, 5 microns and up) 300 gpm (parallel flow w/5 micron bags)
» Design Press:	150 psig
» Design Temp:	225˚F max.
» Height:	5'-1" (overall)
» Width:	4'-0"
» Depth:	6'-2"
» Weight:	1175 lbs. (approx.)

*Capacity (flowrate) depends on factors such as liquid viscosity, micron value of the filter media, solids loading etc. Assuming a 10 micron rating, the clean pressure drop through the bag filter would be 2-3 psi and the drop through the cartridge about 2 psi additional. Lowering the micron rating of the cartridge below 10 will increase the drop into the 4-6 psid range. Cartridges are normally spent at 24-28 psid.

SKID DESIGN

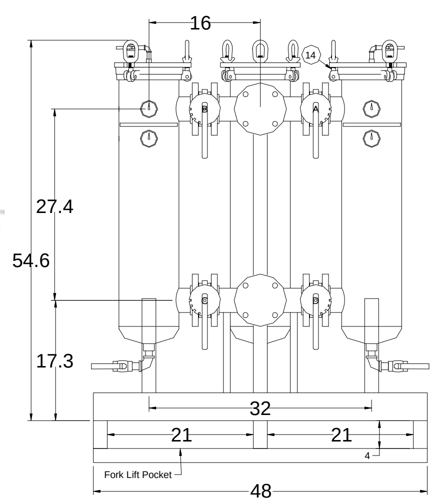
» Skid:	2”x2” and 2”x4” c.s. structural tubing
» Vessel Mount:	Legs are attached to cross supports on skid
» Forklift Pockets:	Through front and rear framing channels (Each pocket is 21” wide)

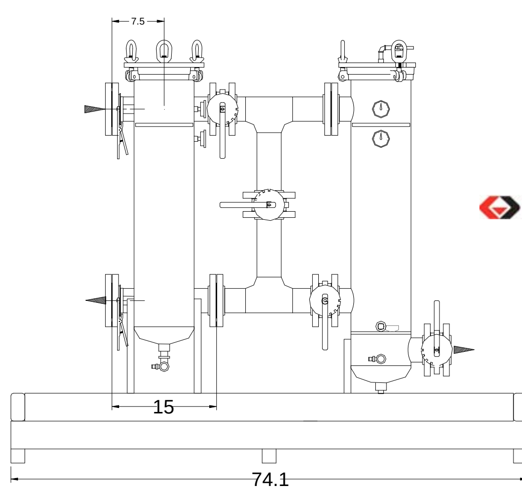
FILTER DESIGN

» Assembly Number:	Krystil Klear L88(CL)303FA41523F4DF
» Vessel Covers:	Three eye nuts; hinged for easy access
» Piping:	3” Sch. 40 304 SS (SA-312-304)
» Inlet & Outlet:	3” Male Cam Lock
» Cartridge Elements:	6 required; Double Open End, 2-1/2” o.d. and 30 inches long; typically polyester or polypropylene string wound; 0.5 micron range and up.
» Bag Elements:	One size #2, 7-1/16” snap ring & 30” length required in each housing; Available fibers range from 1 to 1500 microns.
» Lid Seals:	Buna N
» Valves:	3” 150” butterfly with Buna packing
» Internal Hardware:	*Bag Filter*: 316 SS strainer basket with 9/64” perforations, 30” deep. 6.7” dia. *Cartridge Filter*: 316 SS center guide post, cup & spring assemblies

TESTS / CERTIFICATIONS

» Test Performed:	OEM Hydrotested @ 195 psi. Scheduled QMS inspections after purchase by BakerCorp.





PRODUCT DATA SHEET

January, 2007

FLIP TOP WEIR TANK

(VE ENTERPRISES VERSION)

GENERAL INFORMATION

This fixed-axle tank is fitted with two internal weirs and 14 top inspection doors.

WEIGHTS AND MEASURES

» Capacity:	20,000 gallons
» Height:	8'-6¼" (grade to tank roof) 12'-8½" (grade to top of handrails when up)
» Width :	8'-6"
» Length:	45'-7½" (tank only), 50'-0" (nose-to-bumper)
» Weight:	33,000 lbs.

STRUCTURAL DESIGN

» Floor:	¼" ASTM A36 carbon steel. "V" bottom sloping from each side to centerline of tank
» Sides/Ends:	¼" ASTM A36 carbon steel, corrugated shape
» Roof Deck:	¼" ASTM A36 carbon steel
» Wall Frame:	Corrugations only, no internal frame
» Internal Weirs:	Two internal steel weirs equally spaced to create three compartments inside tank. Overflow weir (forward weir) extends from floor up to one foot from top of tank. Underflow weir extends down from roof and terminates one foot from floor seam at sidewalls. Designed for 16 lbs. per gallon liquid on one side of weir and no liquid on the other side.

FEATURES

» Relief Valve:	None
» Valves:	(2) 4" wafer style butterfly valve, Bray series 30 or equivalent, with cast iron body, Buna-N seat and seals, 316 SS stem, Nylon 11 coated ductile iron disk

FEATURES – cont.

» Fill Line:	One 3-inch schedule 40 ASTM A106B pipe with cap and securing chain. Line enters front of tank near top with dip tube into first compartment down approx. halfway from bottom of tank where it 90° elbows into compartment.
» Front Drain:	One 4" wafer style butterfly valve. Mounted on 150# weld neck flange on tank side and 150# FPT flange on outside with plug and chain.
» Rear Drain:	One 4" wafer style butterfly valve. Mounted on 150# weld neck flange on tank side and 150# FPT flange on outside with plug and chain. Remote-operation handle.
» Rear Process Outlet:	One (1) 4" flanged and blinded nozzle 18" below roof deck
» Top Doors:	14- 51"x39"x10ga plate lids
» Manways:	Three (3) 22" diameter, passenger side
» Manway Seals:	Buna-N (NBR)
» Stairway:	OSHA compliant non-slip stairway with handrails and guardrails
» Walkway:	Full length of tank with guardrails on both sides; door handles accessible

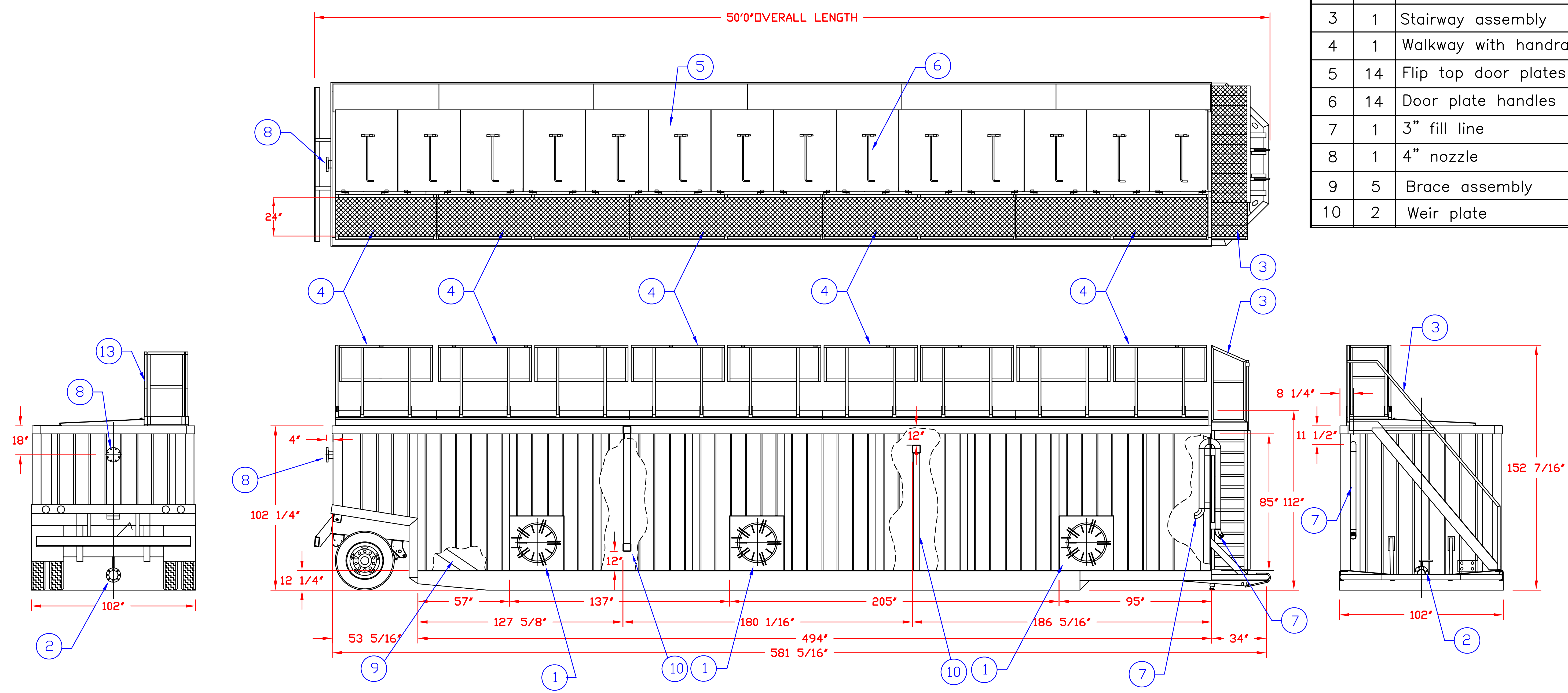
SURFACE DETAILS

» Exterior Coating:	High gloss polyurethane
» Interior Coating:	Chemical resistant lining

TESTS/CERTIFICATIONS

» Test Performed:	100% water-tested to full capacity by OEM, plus level 1, 2 &3 QMS inspections by Baker Tanks

BAKERCORP™



ITEM	QTY	DESCRIPTION
1	3	22" diameter manway
2	2	4" drain conn. w/butterfly valve
3	1	Stairway assembly
4	1	Walkway with handrail
5	14	Flip top door plates
6	14	Door plate handles
7	1	3" fill line
8	1	4" nozzle
9	5	Brace assembly
10	2	Weir plate

SPECIFICATIONS:

1) Tank Capacity: 20,000 gallons (476 BBL)
2) Tank Weight: 33,000 lbs. (empty)

NOTES:

1. This drawing is a baseline representation for this model of tank. Variations between this drawing and the actual equipment in the field can and do exist, primarily with appurtenance locations, sizes and quantities. Consult your local BakerCorp representative if specific needs exist.
2. THIS TANK IS *NOT DESIGNED FOR TRANSPORTING LIQUIDS*. It should be moved only when empty.
3. Tanks of this type have an internal lining (coating) on the wetted surfaces.
4. This tank is constructed from A36 carbon steel.

BAKERCORP
3020 OLD RANCH PARKWAY
SEAL BEACH, CA 90740-2751

REV.	DESCRIPTION	DATE	BY
G			
F			
E			
D			
C			
B			
A	FIXED CUTAWAYS / LINEWEIGHT	7/12/05	Z.E.R

SCALE: DO NOT SCALE	SIZE B	ORIGINAL DWG. DATE 16JUL02
DRAWN BY: P.J.B.	APPROVED BY:	CAT/CLASS --
TITLE VE ENTERPRISES FLIP TOP WEIR TANK		SHEET 1 of 1
DRAWING NO. S-2-M0005-1-		REV. A

Attachment D
Typical Specifications for 700 Gallon Per Minute Temporary Groundwater Treatment Plant

PRODUCT DATA SHEET

March, 2007

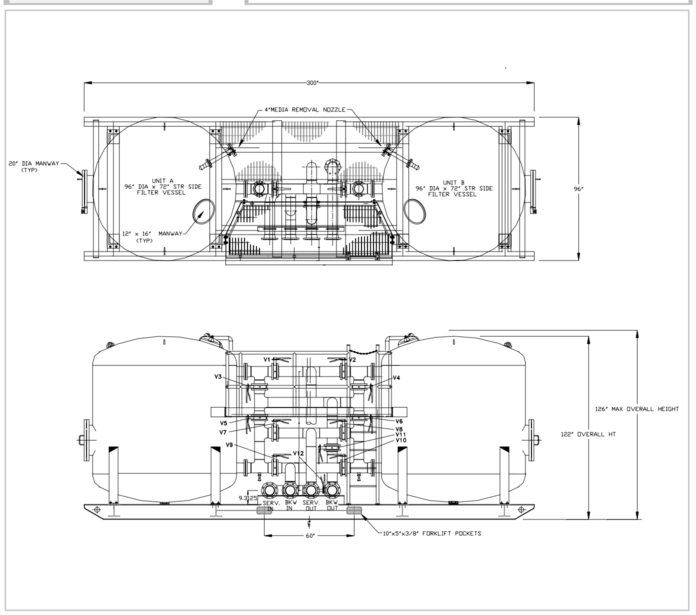
D-KLEEN.WATER 10K

GENERAL INFORMATION

This system is designed for continuous aqueous phase treatment of groundwater or wastewater, and has the ability to remove contaminants to non-detectable levels. The influent stream may be drawn in through the system in either series or parallel flow, and can operate on one vessel only while the other is in backwash mode. BakerCorp can provide a number of service and disposal options for the spent media,

WEIGHTS AND MEASURES

» Max. Flowrate:	Up to 600 gpm in series or 1200 gpm in parallel (application dependent)
» Max. Pressure:	100 psi
» Max. Temp:	150°F
» Height:	10'-6" (overall)
» Width:	8'-0" (skid)
» Length:	25'-0" (skid)
» Diameter:	96" (each vessel)
» Shipping Wt.: (empty)	40,000 lbs.(equipment – 20,000 lbs; activated carbon – 20,000 lbs)
» Operating Wt.:	80,000 lbs. (including 40,000 lbs. water)



FILTER MEDIA

» Types:	▪Activated Carbon ▪Organoclay ▪Ion Exchange Resin ▪Specialty Media
» Volume:	320 cu. ft per vessel (640 cu. ft. total)
» Weight:	~10,000 lbs. each vessel (20,000 lbs. total)

MISCELLANEOUS DATA

» Vessel Code:	ASME Code stamped for 100 psi @ 150°F.
» Service In/Out:	6" Flanged connection w/ sch. 40 piping
» Backwash In/Out:	6" Flanged connection w/ sch. 40 piping
» Manifold Valves:	6" Lever-operated cast iron butterfly
» Media Removal:	4" top-mounted nozzle with draw connection at grade
» Internals:	Lower Underdrain: 6" header/2"x1" drop strainer type constructed of 316 SS Upper Distributor: 6" header/3" open end riser type constructed of 316 SS
» Platform:	Galvanized grating with perimeter guardrails
» Vessel Interior Access:	Top manway – 12"x16" elliptical Side manway – 20" round
» Manway Gaskets:	Neoprene
» Interior Coating:	Polyamine epoxy coating

PRESSURE DROP DATA & OPTIONS AVAILABLE

Contact BakerCorp

NOTE:

1. Wet activated carbon preferentially removes oxygen from air. In closed or partially closed containers and vessels, oxygen depletion may reach hazardous levels. If workers are to enter a vessel containing carbon, appropriate procedures for potentially low oxygen spaces must be followed, including all federal and state requirements.

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PRODUCT DATA SHEET

January, 2007

YARDNEY 4-POD SAND FILTER

(Equip. # SFL21988 and earlier)

GENERAL INFORMATION

Skid mounted high rate automatic backwashing sand media filter (4 tanks (pods)) designed for general-purpose water filtration of organic and inorganic solids (Yardney Model # IL5424-4AS2). Powered by 110 V external power supply, or battery with solar cell recharge for remote operation.

WEIGHTS AND MEASURES

Capacity:	504 – 756 gpm (Normal flow range) 1000 gpm (Peak flow)
Design Press:	80 psi maximum
Temperature:	Limit to ambient. Consult BakerCorp if temperature exceeds 100 degrees.
Filtration:	To 50 microns
Height:	8'-11" (overall)
Width :	6'-3"
Length:	20'-1"
Weight:	6,326 lbs. – equipment only 14,500 lbs. – media only 28,000 lbs. - operational
Backflush:	240 gpm, automatic

OPERATING REQUIREMENTS

Compressed Air:	5 cfm minimum at 60 psi [Note: external air supply required]
Sand Media:	Crushed silica, 0.47MM (#80 grit)
Gravel Media:	#3 crushed rock, ½" x ¾"
Input Power:	Selectable input power of customer supplied 110 V AC, or 12V DC from a unit mounted solar package.
Output Power:	12V DC

FEATURES

System Controller:	Automatic Filter Controller. Flush activation based on elapsed time and/or pressure differential.
Piping:	Inlet & outlet pipe is 6" A53B, 3/16" wall; weld fittings are A234; flanges are A106. Backflush piping is 4" schedule 40 PVC.
Solar Panel:	Uni-Solar Model UA-5 (5 watts) module.

FEATURES – con't

Press. Gauge:	2" face, ¼" NPT bottom connection, stainless steel case, plexiglass lens, brass bourdon tube, 0-100 psi range.
Flowmeter:	Six-inch propeller type meter, AWWA C704-92 compliant. Instantaneous flowrate indicator and six-digit totalizer. Accuracy is ±2% of reading. Repeatability of 0.25%. Rated at 90-1200 gpm, 150 psi, 160°F. Tube: epoxy-coated carbon steel; Impeller: high-impact plastic.
Butterfly Valves:	Effluent / Influent: 6" with cast iron body (epoxy coated), EPDM seat, 304 SS stem and aluminum bronze disc. Tank Isolation: 4" grooved ends, EPDM disc coating
Ball Valves:	Four-inch, bronze body and brass ball; seat is carbon/glass-filled PTFE. ¼ turn open or close.
Solenoid Valve:	12V DC, normally closed type 7121V (energizing opens valve).
Differential Press. Switch:	0-30 psid. Two-inch dial, plated steel case, ±3% accuracy.
Air / Vacuum Release Valve:	2" Bernard Model 4415 valve, mounted on backwash, influent and effluent lines
Battery:	Sealed rechargeable lead-acid, 12V, NP2.6-12
Battery Charger:	Power-Sonic Model PSC-12500A, 12 volts.
Tubing:	Pressurized – ¼" 304 ss w/ Hoke fittings; Drain - ¼" polypropylene; Vent – schedule 80 PVC

SURFACE DETAILS

Interior Coating:	3M Skotchkote 134
Exterior Coating:	High Gloss Polyurethane

TESTS/CERTIFICATIONS

Tests Performed:	OEM pressure tested. BakerCorp performs scheduled QMS inspections.

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PRODUCT DATA SHEET

March, 2008

8” 304 STAINLESS STEEL 12-BAG FILTER SYSTEM

GENERAL INFORMATION

Single vessel mounted on a forkliftable skid. Housing is not ASME code stamped. Different filter elements are available depending on job requirements and should be specified by the customer prior to use.

WEIGHTS AND MEASURES

» Capacity*:	1200 – 2000 gpm (@ 1 micron and up)
» Design Press:	150 psig
» Design Temp:	225°F max. (gasket dependent)
» Height:	7'-5" (overall)
» Width:	4'-11"
» Depth:	7'-5"
» Weight (dry):	1075 lbs. (approx.)

*Capacity (flowrate) depends on factors such as liquid viscosity, micron value of the filter media, solids loading etc. Assuming water as a filtrate and factoring in pressure drop only, 2000 gpm is a practical upper limit for a size #2 bag with a 100 micron rating; 1200 gpm with 1-micron rated bags.. Clean pressure drop would be 2-3 psi. Lowering the micron rating increases the pressure drop. The minimum pressure drop for this unit at higher micron ratings is 1-2 psi. Filter bags should be changed out at 15-18 psid, or earlier if the process requires it.

SKID DESIGN

» Skid:	2”x2”x0.25” A36 c.s. structural tubing
» Vessel Leg Supports:	3x3x.375 angle, SA-36
» Forklift Pockets:	Through front and rear framing channels

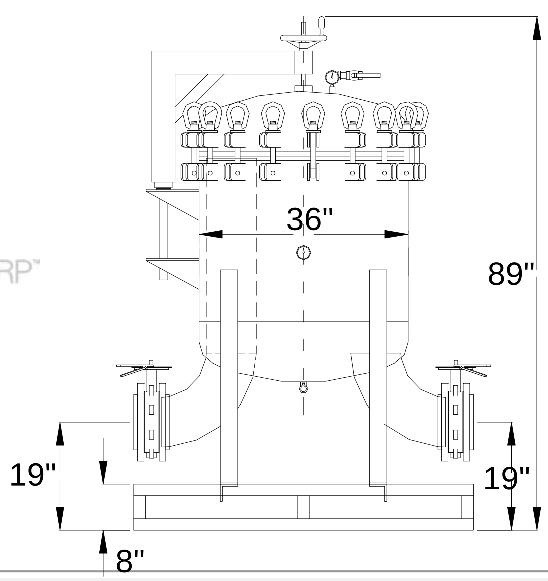
FILTER DESIGN

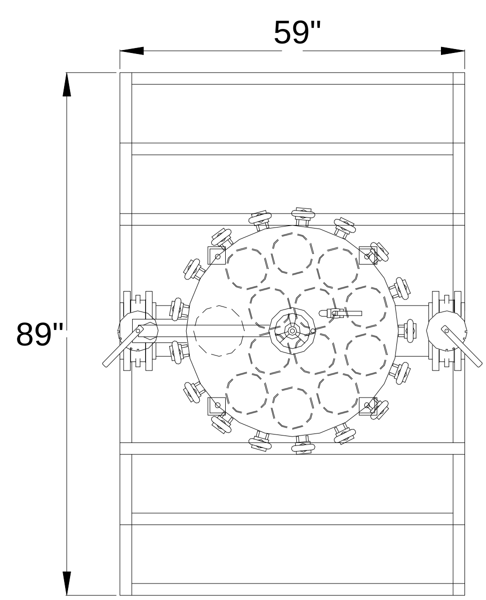
» Assembly Number:	Krystil Klear LR12-36-30-8F-A-4-15-SP
» Top Head:	(17) closure bolts and nuts with davit lift assembly. 36” O.D., 0.25” thk, SA-240 Gr. 304 stainless steel
» Shell:	36” O.D., 0.25” thick x 28” L . R & T, SA-240 Gr. 304 stainless steel
» Inlet & Outlet:	8” 150# RFSO flanges, SA-182 Gr. 304 S.S.
» Bag Elements:	12 required: size #2, 7-1/16” snap ring & 30” length required; Available fibers range from 1 to 1500 microns.
» Lid Seal:	Buna N O-ring
» In/Out Valves:	8” 150” butterfly with Buna seat
» Internal Hardware:	SA-240 Gr. 304 S.S. tube sheet

TESTS / CERTIFICATIONS

» Test Performed:	OEM Hydrotested @ 195 psi. Scheduled QMS inspections after purchase by BakerCorp.

BAKERCORP





BAKERCORP

3020 Old Ranch Parkway • Suite 220 • Seal Beach, CA • 562-430-6262

PRODUCT DATA SHEET

1/4/2012

BP44LS-GD66AT

BakerPrime 4x4 Low Pressure Solids Handling Unit (Attenuated, Trailer)

GENERAL INFORMATION

The compressor/venturi priming system uses a compressor to blow compressed air through a jet into a tapered tube to create a vacuum on the suction.

PERFORMANCE DATA

» Flow (min/max):	-	60 gpm / 925 gpm
» Minimum Shutoff Head:	-	87 feet (38 psi) @ 1550 rpm (1)
» Maximum Shutoff Head:	-	152 feet (66 psi) @ 2100 rpm (1)
» Minimum Speed:	-	1550 rpm
» Maximum Speed:	-	2100 rpm
» Maximum Suction Lift:	-	25 feet (2)
» Maximum Casing Press:	-	99 psi
» Maximum Temperature:	-	160°F (7)
» Maximum Solids Size:	-	3" spherical diameter

PUMP SPECIFICATIONS

» Impeller:	-	9.75"
» Bearing Lubrication:	-	SAE No. 30 Oil
» Vacuum System:	-	8.5 cfm Compressor/Venturi
» Mechanical Seal Lube:	-	SAE No. 30 Oil (3)

PHYSICAL SPECIFICATIONS

» Suction Size:	-	4" flange
» Discharge Size:	-	4" flange
» Approximate Weight:	-	5223 lbs dry / 5720 lbs wet
» Overall Height:	-	89" (to top of lifting eye)
» Overall Width:	-	63" (outer most edges)
» Overall Length:	-	137" (nose to tail)

Enclosure

> Enclosure is made from Galvaneal. Hinged doors on each side provide easy interior access for servicing. Soundproof insulation provides the quietest operation in the industry, and the entire unit, including controls, can be locked for added security.

» Sound Rating:	-	67 dBA at 23 feet

BakerCorp Reference # 404-0105

MATERIAL SPECIFICATIONS

» Pump Casing:	-	Gray Iron No. 30
» Shaft Sleeve:	-	17-4 PH S.S.
» Wear Rings:	-	Carbon Steel No. 1018
» Mechanical Seal Faces:	-	Silicon-Carbide/Silicon-Carbide
» Pump Shaft:	-	Alloy Steel No. 4140
» O-rings:	-	Buna-N
» Impeller:	-	Ductile Iron No. 4140
» Check Valve Body:	-	Gray Iron No. 30
» Check Valve Flapper:	-	Buna-N

ENGINE SPECIFICATIONS

» Engine Make/Model:	-	Deere 4024H
» Total Displacement:		2.4 Liter
» Aspiration:	-	Turbocharged
» Max. Continuous BHP:	-	66 @ 2400 rpm (4)
» Crankcase Oil:	-	SAE 10W40 (5)
» Coolant:	-	50/50 Water/Antifreeze
» Safety Shutdowns:	-	High Water Temp & Low Oil Pressure
» Fuel Consumption:	-	2.78 gal/hr @ 1800 rpm (6)
» Run Time:	-	25 hours at 1800 rpm at 80% Engine Load
» Fuel Capacity/Type:	-	70 gal of No. 2 diesel
» Number of Cylinders:	-	Four

Notes:

(1) Based on 1.0 specific gravity

(2) Depends on flow rate, pump speed, and elevation. See performance curve.

(3) Should always be visable and clear in appearance thru sight glass.

(4) WARNING – this is the rated speed for the ENGINE ONLY. The rated speed of the pump is less. See curve for max pump RPM.

(5) Must be changed every 250 hours of runtime.

(6) Run time fluctuates with speed and engine loads.

(7) Equipment material limitation. Lower max temperature may be necessary due to application conditions and pump NPSH requirements.

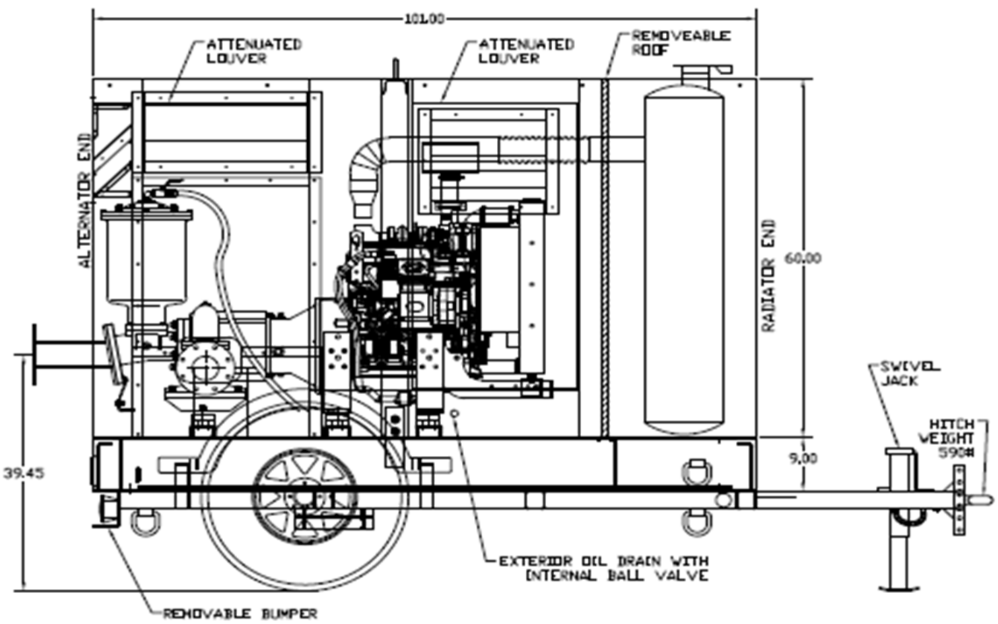
PRODUCT DATA SHEET

1/4/2012

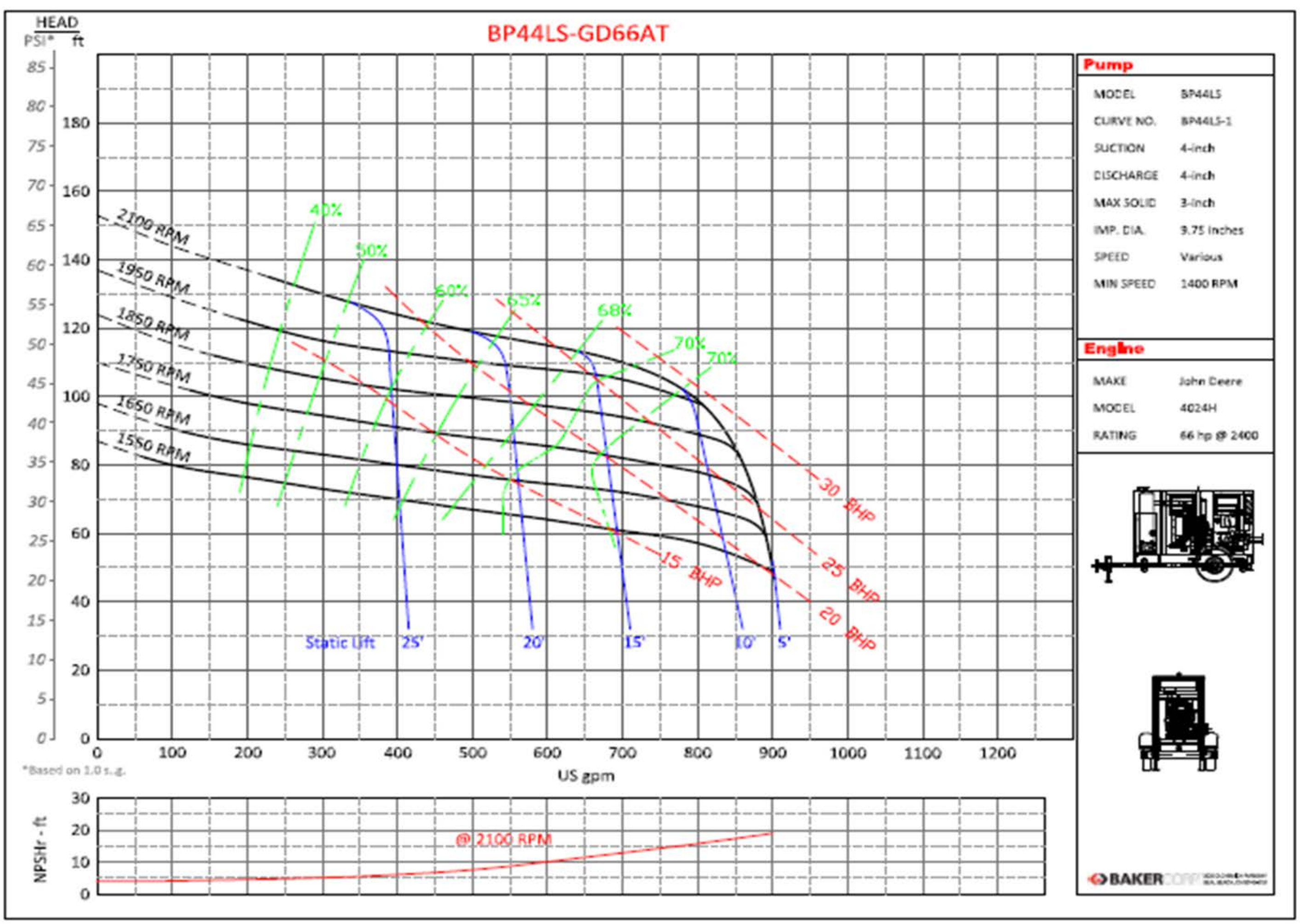
BP44LS-GD66AT

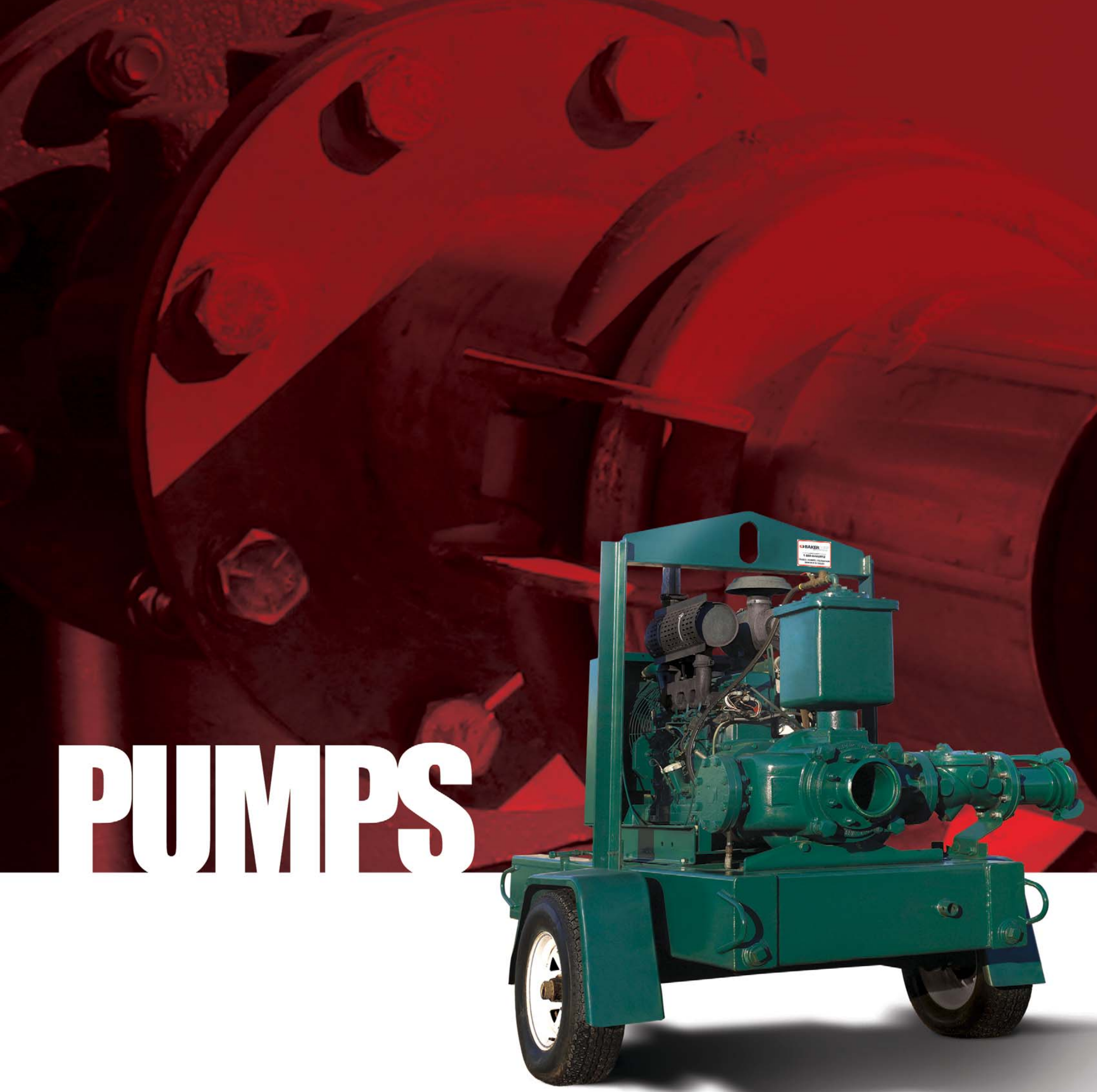
BakerPrime 4x4 Low Pressure Solids Handling Unit (Attenuated, Trailer)

PHYSICAL SPECIFICATIONS



PERFORMANCE CURVE





PUMPS

BAKERCORP™
PEOPLE. EQUIPMENT. SOLUTIONS.

TOUGH JOBS. PROVEN RESULTS.

PUMPS FROM BAKER. MAXIMUM PERFORMANCE. ZERO HASSLE.

Since 1942, BakerCorp has thrived in a very demanding business. We began by renting temporary steel storage tanks to the oilfield industry. Today, we are the largest, most experienced containment, pump and filtration company in the world with over 90 locations nationwide and international operations in Europe, Canada and Mexico. We serve a breadth of market segments including chemical, manufacturing, refining, oil and gas, construction, municipal, industrial services and environmental remediation.

BakerCorp has achieved this success by adhering to the highest standard of excellence throughout every area of our business. We stock the largest inventory of quality equipment and keep it running with the most comprehensive maintenance program in the industry. Our teams are comprised of highly-trained professionals with years of experience and vast product knowledge. Their dedication to providing customers with unparalleled, 24/7/365 personal service is constant and unwavering. From the earliest stages of your project's planning through its completion, BakerCorp will work closely with you to design the best solution based upon the specific needs of your application.

Partnering with BakerCorp on your projects means that you will work alongside professionals dedicated to providing quality solutions—integrated solutions that pull from a deep pool of talent, equipment and experience. It means that your challenges will be resolved using the most logical and comprehensive mix of tanks, pumps and filtration systems available anywhere. BakerCorp's depth of experience and reputation for innovative system design ensures your project will be brought to a successful conclusion—the first time and every time.

We know pumps. We know systems. And we know how to get the job done. Whatever the challenge—wastewater removal, flood control, sewer bypass or hydroblast pad water recirculation—you'll find BakerCorp on the job.

Nobody is better equipped than BakerCorp. We inventory an extensive fleet of the highest quality prime assist, self-prime, diesel-driven, electric drive, centrifugal and submersible pumps along with a broad range of pipe, hose and fittings. Our pumps perform at the maximum level because each pump undergoes a rigorous maintenance program completed by certified mechanics to insure the highest level of dependability before it is delivered to the jobsite.

BakerCorp offers an unbeatable combination of equipment selection and application expertise that you can rely on when you're up against a tough pumping project. Our field personnel are cross-trained to be technical experts who specialize in pumps, and nothing but. Closer to application engineers than sales people, they'll point you to solutions that will be cost-effective, labor-friendly and dependable. From system design and set-up to removal after a completed job, you can count on pumping solutions from BakerCorp.

PROVIDING PROVEN SOLUTIONS TO INDUSTRY FOR OVER 65 YEARS.

MUNICIPAL

- Sewer bypass and pipeline projects
- Lift station repair
- Temporary pumps used during sanitary sewer overflow
- Sludge pumping for wastewater lagoon clean-up

CONSTRUCTION

- Dewatering
- Temporary firewater systems
- Dust control
- River, lake and stream dredging projects

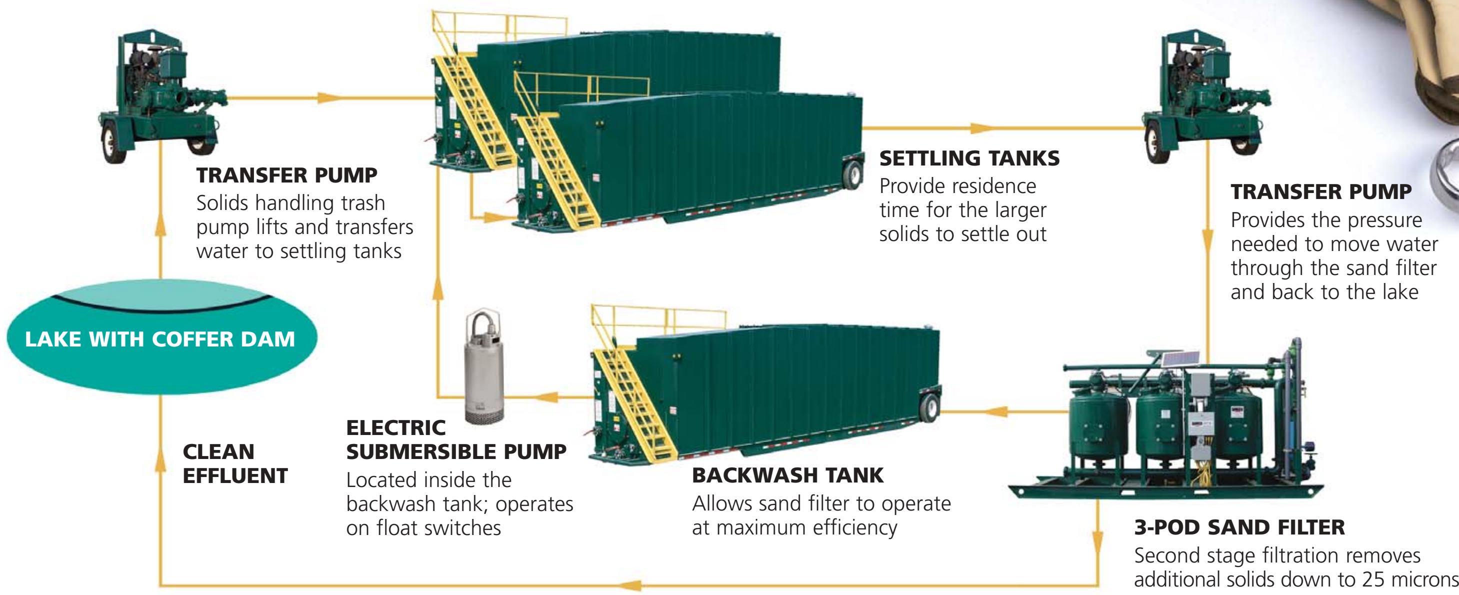
MANUFACTURING

- Liquid transfer for treatment plant projects
- Temporary pumping for stormwater runoff control
- Additional liquid transfer capacity during maintenance or repairs

REFINERIES

- Pumping for cooling tower liquids and sludges
- Hydroblast pad water recirculation
- Hydrotesting
- Portable pumps for wastewater treatment plant overloads

RENTALS, SALES AND 24/7/365 NATIONWIDE SERVICE... BAKER DELIVERS.



ANATOMY OF AN INTEGRATED BAKERCORP DEWATERING SYSTEM
The above diagram shows a typical dewatering system for lakeside construction. Using this system, a large volume of dirty, silty water can be pumped from inside a coffer dam and through the filtration process efficiently. The construction can then be completed inside the coffer dam while the clean effluent water is safely returned to the lake.

Our emergency response service is available 24/7/365 by field technicians that work exclusively on pumps. Their expertise in the field is unmatched and supplemented with ongoing specialized technical and mechanical training.

SETTING THE STANDARD—THE BEST MAINTAINED PUMPS IN THE INDUSTRY.

You can count on BakerCorp's vast network and inventory for immediate delivery of the highest quality pumps and systems. Our rigorous QMS maintenance program—patterned after ISO 9000 certification guidelines—helps insure consistent delivery of peak performance and dependability. Designed and tested to meet NESHAP and OSHA standards, every pump must pass up to three levels of inspection by a BakerCorp certified mechanic before release into the field.

Performance tests are conducted on the engine and pump including starting, idling and shut down operations. All seals, gaskets, valves, discharge manifolds, guards, plugs, filters, pipes, hoses and fittings are carefully checked for any breach of integrity. Fluid levels are topped off and equipment is given a final check for cleanliness and instructions for operation.

A Reputation for Excellence
Our technical sales staff's ability to accurately evaluate the needs of your project, design an effective solution and manage its timely delivery and installation is second to none.

Other team members regularly participate in Pump Application Training (P.A.T.) to keep informed of current technologies and trends.

In addition, stringent safety programs focusing on both site and product specific training help ensure that our people bring an unparalleled level of expertise to each and every job.

SEWER BYPASS

REFINERY TURNAROUND

RESIDENTIAL DEWATERING

In addition to the industry's most comprehensive pump solutions, BakerCorp's tank and filtration divisions deliver the same levels of expertise, service and quality synonymous with our pump solutions.

TANKS. NO BIGGER INVENTORY. NO BETTER SERVICE.

Nobody knows temporary containment like BakerCorp. With an unmatched inventory of tanks and accessories, we rent 17 varieties of steel tanks alone, along with poly tanks, roll off boxes, and specialty equipment.

Our unrivaled history and experience, combined with our world-class applications expertise and 24/7/365 emergency-ready support, BakerCorp gets the call on the toughest containment challenges. Our engineers analyze every aspect of your project resulting in a highly efficient solution. Then we deliver it directly to your jobsite, set it up and remove it once the project is complete.

Whatever the job—construction runoff, cooling tower cleaning, wastewater storage/treatment or environmental remediation—BakerCorp delivers.

FILTRATION. LIQUID OR VAPOR. CLEARLY SUPERIOR SOLUTIONS.

From engineered solutions to on-site services and waste management, BakerCorp provides filtration expertise in the fields of specialty media, applied science, and hazardous materials. Our scientists and engineers—with extensive knowledge of contaminants, environmental laws and regulations, hazardous material management and health and safety—enable us to customize solutions to meet exact requirements. And once in place, our on-site service technicians and waste management teams provide comprehensive support.

Whatever your needs, BakerCorp is on call, nationwide, wherever and whenever.

PUMPS









	Priming Assisted	Self Priming	High Pressure	Electric
Ideal Usage	Construction site dewatering, sewer bypass, tank cleaning, flood management, municipal projects.	Refineries, chemical facilities, waste water treatment plants, construction site dewatering.	Industrial water blasting, Pipeline pigging, irrigation, standby fire protection, environmental cleanups.	Construction and industrial applications of all types where diesel engines are not allowed or are impractical.
Benefit	Can operate in flooded conditions and pull a suction lift. Fully automatic priming. Dry-run capability.	Low maintenance. Easy access with large cleanout port. Emergency shutdown features.	Produces enough pressure to eliminate multiple pumps. Operates in flooded conditions. Unattended operation.	Clean and quiet operation. Refueling is not required.
PERFORMANCE				
Suction Size	4" – 12"	3" – 6"	4" – 10"	3" – 10"
Discharge Size	3" – 12"	3" – 6"	3" – 8"	3" – 8"
Max Flow Range	300 gpm – 6,000 gpm	450 gpm – 1,700 gpm	800 gpm – 5,200 gpm	Up to 5,200 gpm
Suction Lift	Up to 28'	Up to 28'	Up to 28'	Up to 28'
Max Shut Off Head Range	90' – 490'	112' – 171'	285' – 490'	Up to 480'
Max Solids Size	Up to 3.35"	Up to 3"	1/2" – 3.35"	Up to 3.35"
Max Operating Temp	150° F – 190° F	Up to 160° F	150° F – 175° F	Up to 160°F
Fuel	No. 2 Diesel	No. 2 Diesel	No. 2 Diesel	Electric; 115/230/460 volts
Run Time per Full Tank	Typically 24 hrs. Call for details.	Typically 24 hrs. Call for details.	8 – 24 hours	N/A
Fuel Capacity	30 gallons – 171 gallons	50 gallons – 88 gallons	60 gallons – 235 gallons	N/A
Operating Speed	1,000 rpm – 2,400 rpm	1,000 rpm – 2,200 rpm	1,000 rpm – 2,400 rpm	Typically 1,800 rpm
GENERAL INFORMATION				
Weight	2,050 lbs – 7,900 lbs	2,000 lbs – 3,900 lbs	3,300 lbs – 7,900 lbs	Less than diesel counterparts
Standard Mount	Trailer or skid	Trailer or skid	Trailer or skid	Skid
Prime Mover	Diesel engine and electric motor	Diesel engine and electric motor	Diesel engine and electric motor	Typically open drip proof motors
Casing Material	Ductile iron, cast iron and 316 stainless steel	Cast iron	Cast iron and stainless steel	Ductile iron or cast iron
Seal Type	Silicon carbide/silicon carbide or silicon carbide/tungsten carbide	Tungsten/tungsten or silicon/silicon	Silicon carbide and tungsten carbide	Silicon carbide and tungsten carbide
Safety Features	Coupling guards; high water temperature and low oil pressure shutdowns on diesel engines.	Coupling guards; high water temperature and low oil pressure shutdowns on diesel engines.	Coupling guards; high water temperature and low oil pressure shutdowns on diesel engines.	Coupling guards. Circuit breakers and overload protection in NEMA 3R enclosures.

	Electric Submersible	Hydraulic Submersible	Air Diaphragm	Sound Attenuated	Utility
Ideal Usage	Removing water and handling solids up to 3.15" when electric power source is available.	High suction lift applications such as sewer bypass jobs. Dewatering of mines, quarries and gravel pits.	Sludge and slurries, flood control and dewatering situations associated with refineries. Applications where compressed air is available.	Sewer bypass projects in residential areas. "Quiet Zones" such as hospitals or retail commercial areas.	Construction site dewatering, product transfer, emergency standby, sewage transfer, irrigation and farm use.
Benefit	Around–the–clock unattended operation. User-friendly. Quiet operation. Lower labor costs.	No suction line limitations. Unattended operation. Submerged pump head. Variable speed. No electrical requirements.	Light and portable. Adjustable flow rates. Non-stall air valves. Easy to use. Flexible. Reduces down time.	Sound enclosures significantly reduce noise. Tested to meet CPB standards.	Light and portable. Easy access to pump. Economical, maintenance-free, self-lube mechanical seal.
PERFORMANCE					
Suction Size	—	—	1"– 3"	4" – 8"	2" – 3", NPT
Discharge Size	3" – 10"	4" – 6"	1"– 3"	4" – 8"	2" – 3", NPT
Max Flow Range	100 gpm – 5,000 gpm	Up to 1,750 gpm	40 gpm – 250 gpm	150 gpm – 2600 gpm	225 gpm – 425 gpm
Suction Lift	N/A	N/A	Up to 24'	Up to 28'	Up to 20'
Max Shut Off Head Range	Up to 375'	65' – 130'	Up to 230'	Up to 195'	Up to 98'
Max Solids Size	3/8" – 4"	Up to 4"	1/4" – 2"	3"	Up to 1 1/2"
Max Operating Temp	100° F – 120° F	150° F – 190° F	212° F	160° F	150° F
Fuel	Electric; 115/230/460 volts	No. 2 Diesel (for the hydraulic power unit)	Compressed air	No. 2 Diesel	Gasoline
Run Time per Full Tank	N/A	24 hours	N/A	24 hours	Two hours
Fuel Capacity	N/A	50 gallons – 112 gallons	N/A	61 gallons – 84 gallons	1 gallon – 1.5 gallons
Operating Speed	Typically 1,800 rpm or 3,600 rpm	1200 rpm – 2200 rpm (engine speed)	N/A	1,000 rpm – 2,200 rpm	2,000 rpm – 3,600 rpm
GENERAL INFORMATION					
Weight	30 lbs – 1,500 lbs	135 lbs – 420 lbs (pump head)	79 lbs – 379 lbs	4,100 lbs – 4,700 lbs	90 lbs – 150 lbs
Standard Mount	N/A	HPU's are trailer mounted	Skid or roll cage	Skid or trailer	Roll cage
Prime Mover	Electric motor	Diesel engine/Hydraulic fluid	Air operated reciprocating diaphragms	Diesel engine	Gasoline engine
Casing Material	Cast iron, aluminum and stainless steel	Cast iron or carbon steel	Aluminum, stainless steel, and polypropylene	Cast iron or ductile iron	Aluminum
Seal Type	Tandem, oil lubricated.	Tungsten/tungsten or carbon/Ni-hard steel	N/A	Silicon carbide and tungsten carbide	Silicon carbide; grease lubricated
Safety Features	Circuit breaker and motor overload protection in NEMA 3R enclosures.	High water temperature and low oil pressure shutdowns on diesel engines. Hydraulic system overpressure protection.	No fuel handling required. No electrical hook-ups required.	Coupling guards; high water temperature and low oil pressure shutdowns on diesel engines.	Auto shutdown on low oil level. Roll cage.

VISIT www.bakercorp.com FOR ADDITIONAL SPECIFICATIONS. CALL YOUR LOCAL BRANCH FOR PRODUCT AVAILABILITY. 1-800-BAKER 12

PIPE, HOSE AND FITTINGS

BakerCorp inventories a complete range of pipe, hose and fittings in various diameters to handle any required flow capacity, including high pressure pumping. BakerCorp can exceed the requirements for any application.

ALL TYPES OF PIPE AND HOSE
- Steel
- Aluminum
- Industrial groove

HDPE FOR HIGH PRESSURE AND FLOW
- Up to 30" diameters
- Fusion machines

MULTIPLE END CONNECTORS
- Bauer
- Quick disconnect
- Camlock
- Flanged


ACCESSORIES

BakerCorp offers a variety of accessories including:
- Secondary Containment Berms
- Road Crossings
- Generators
- Fuel Tanks
- Spill Guards
- Auto-Start Options

MORE EQUIPMENT. MORE LOCATIONS.

BAKERCORP™

3020 Old Ranch Parkway, Suite 220
Seal Beach, California 90740
1-800-BAKER 12
1-562-430-4865 Fax
www.bakercorp.com

FILTRATION

BAKERCORP™

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TOUGH JOBS. PROVEN RESULTS.

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From engineered solutions to on-site services and waste management, BakerCorp provides filtration expertise in the fields of specialty media, applied science, and hazardous materials. Our team of scientists and engineers—with extensive knowledge of contaminants, environmental laws and regulations, hazardous material management and health and safety—enable us to customize solutions to meet specific project requirements for both temporary and permanent applications. And once in place, our on-site service technicians and waste management teams provide comprehensive support. BakerCorp is on call, nationwide, wherever and whenever you need us.

Whatever your needs—vapor & liquid, organic & inorganic, high-flow & low-flow—BakerCorp provides superior solutions. Specialty media applications include activated carbon, ion exchange resins, impregnated media, organoclay, sand and gravel. Our equipment lineup includes high and low-pressure carbon and specialty media vessels, odor control systems, sand filters, duplex cartridges, bag filters and auxiliary equipment.

From timely delivery, installation, pumping and vacuuming to packaging, transporting, recycling, incineration and disposition, BakerCorp offers a full complement of unsurpassed filtration systems and support services.

PROVIDING PROVEN SOLUTIONS TO INDUSTRY FOR OVER 65 YEARS.

ENVIRONMENTAL REMEDIATION
- Contaminated groundwater/soil treatment
- Dredging
- MTBE, perchlorate and metals removal

OIL, NATURAL GAS AND CHEMICAL
- Tank and sump venting
- Tank cleaning and turnaround projects
- Pipeline pigging and maintenance
- Vapor recovery, amine and glycol applications
- Hydrogen sulfide and mercaptans removal

PROCESS EMISSION CONTROL
- Fugitive emission control
- Purification/separation
- Wastewater
- Municipal water and wastewater plants

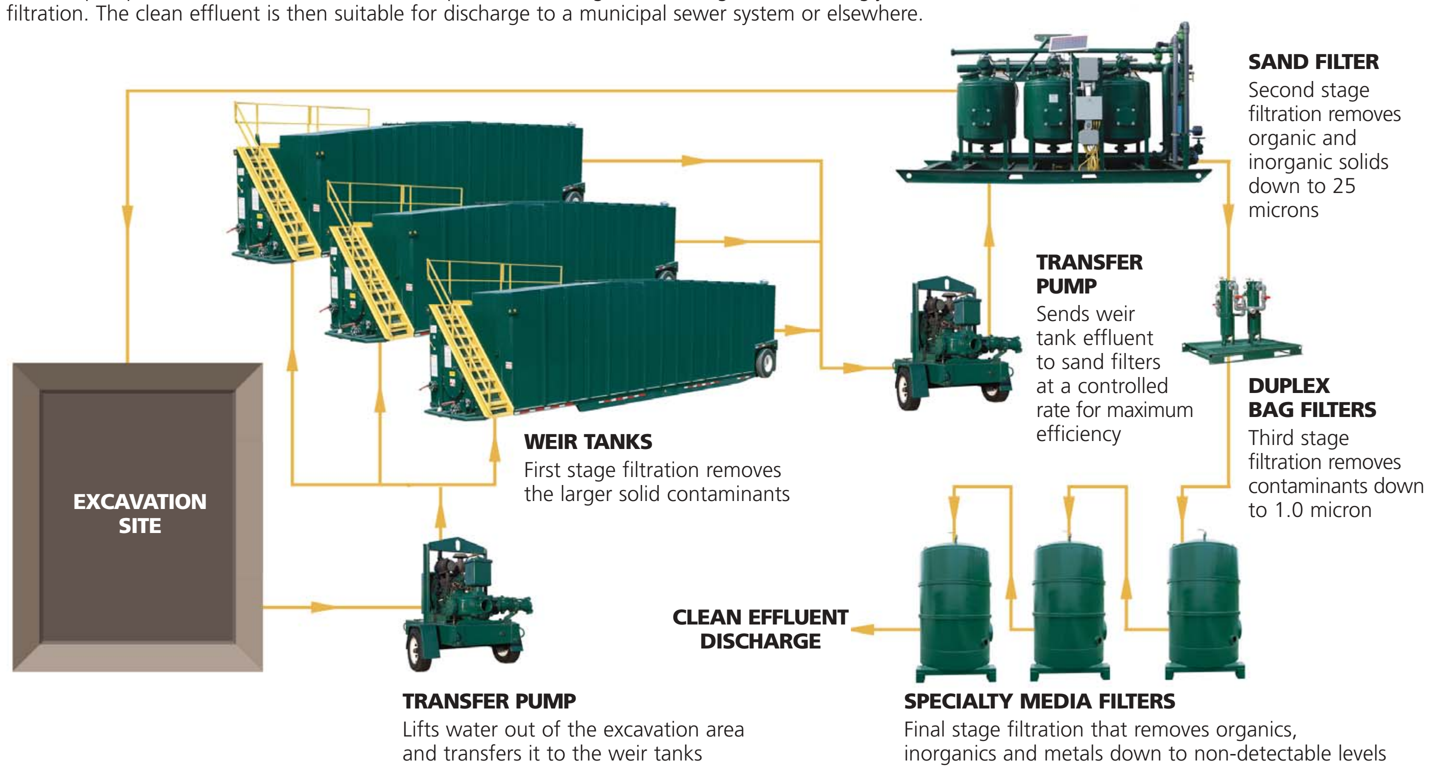
CONSTRUCTION
- Removal of turbidity, organic, inorganic and metals in dewatering projects
- Odor control for sewer bypass work
- Stormwater runoff, phase II of NPDES

EMERGENCY RESPONSE
- Filtration of contaminants in natural and man-made incidents and disasters

DESIGN. INSTALLATION. ON-SITE SERVICE. BAKER IS ON CALL...NATIONWIDE.

ANATOMY OF AN INTEGRATED BAKERCORP FILTRATION SYSTEM

The diagram below shows a typical groundwater treatment system in which contaminated runoff water and soil drainage can be removed and safely disposed of before new construction begins. Contaminated water is pumped out of the excavation site and processed through several stages of increasingly fine filtration. The clean effluent is then suitable for discharge to a municipal sewer system or elsewhere.



UNSURPASSED FILTRATION SYSTEMS AND SERVICES.

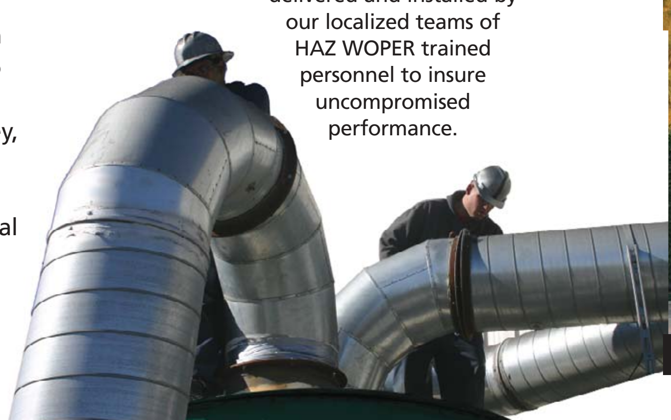
High and low-pressure carbon and specialty media vessels. Odor control systems. Sand filters. Duplex cartridges. Bag filters and auxiliary equipment. No other company offers a more comprehensive lineup of filtration equipment than BakerCorp. We have individual units capable of handling up to 1000 gallons per minute and multiple units can be manifolded together for greater capacity. Our specialty media applications include activated carbon, ion exchange resins, impregnated media, organoclay, sand and gravel and enable us to provide clearly superior solutions to today's filtration challenges.

Custom Engineered Solutions

Leading experts in the fields of specialty media, applied science, and hazardous materials, our scientists and engineers set the industry standard for excellence in custom application solutions. Detailed analysis of every requirement of your project ensures that the system we design meets all of your budgetary and regulatory requirements.

On-Site Services

With regional service centers nationwide, BakerCorp is able to provide an unmatched level of on-site services to complement its filtration solutions. Our specialty teams provide a turn-key, cradle-to-grave solution that includes vacuuming, packaging, transporting, recycling, incineration and land disposal of your spent filtration media. Our OSHA trained technicians, hazardous transportation network, hazardous and non-hazardous recycling facilities and fully permitted incineration facilities provide you with peace of mind while meeting regulatory compliance for any type of waste stream you may encounter.



All of our systems are delivered and installed by our localized teams of HAZ WOPER trained personnel to insure uncompromised performance.

ENVIRONMENTAL REMEDIATION

STORMWATER RUNOFF

SEWER BYPASS ODOR CONTROL

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Whatever the challenge—wastewater removal, flood control, sewer bypass or hydroblast pad water recirculation—you'll find BakerCorp on the job.

FILTRATION





	Specialty Media	Sand	Duplex Cartridge	Duplex Bag	Odor Control
Ideal Usage	Environmental and industrial contaminant removal, liquid and vapor phase.	Construction, environmental, and industrial sediment removal.	Construction, environmental, and industrial applications.	Industrial and commercial process fluids, urban runoff, groundwater discharge from construction sites or stormwater.	Sewer by-pass and other temporary odor control projects. SCAQMD approved.
Benefit	Skid mounted for portability. Backwashing capabilities. Influent/ effluent gauges and sample ports.	Fully automated. Anti-siphon valves. Easy-to-read gauges. Tool-free plumbing connections. User-friendly. Energy efficient. Lower labor costs.	Portability. Flange-to-flange connections. Continuous operation even during maintenance or filter changes. Reduced mobilization costs.	Coarse filtration in a portable unit. Low or moderate flow particulate removal. Quick installation. Meets municipal requirements for nationwide use.	Adjustable flow range. Variable frequency drive. Sound attenuation. Inlet/outlet sample ports. Simple operation. Meets local regulations.
PERFORMANCE					
Capacity	Liquid: 10 gpm – 1000 gpm; Vapor: 120 cfm – 20,000 cfm	74 gpm – 954 gpm (max normal flow range), depending on model	800 gpm	50 gpm – 200 gpm per clean filter	10,000 cfm
Pressure	Liquid: 0 psi – 75 psi; Vapor: 0 psi – 75 psi	80 psi – 100 psi depending on model	150 psi	150 psi	2 psi
Temperature	Liquid: Ambient to 150° F; Vapor: Ambient to 150° F	Limit to ambient. Consult BakerCorp if temp exceeds 100°	400° F max	w/ PVC Pipe: 140° F; w/ Steel Pipe: 225° F	150° F
Filtration	Down to non-detect levels	Down to 25 microns	Down to 0.5 micron	Down to 1.0 micron	Odor removal
Media Weight Range	Liquid: 100 lbs – 20,000 lbs; Vapor: 100 lbs – 20,000 lbs	1,800 lbs – 14,500 lbs	N/A	N/A	4,000 – 8,000 lbs
Height Range	Liquid: 30" – 190"; Vapor: 30" – 168"	6' 3" – 7' 7"	8' 5" overall	5' 0" – 12' 0"	Approx 14'
Width/Diameter Range	19" – 120"	3' 10" – 5' 0"	7' 0"	3' 8" – 4' 9"	8 0"
Length Range	Skid units available. Call for details.	10' – 21' 3"	15' 0"	4' 8" – 5' 8"	Approx 16'
Equipment Weight Range	45 lbs up. Contact BakerCorp.	1,750 lbs – 6,400 lbs	2,000 lbs	550 lbs – 900 lbs (approx)	Contact BakerCorp.
FEATURES					
Type of Media Used	Granular activated carbon, ion exchange resin, zeolite, organoclay.	Silica, sand, gravel	40" long replaceable cartridges	Filter bags, size #2.	Specialty media
Material of Construction	Carbon steel with epoxy coating on interior surfaces. Some models available in polyethylene.	Carbon steel vessels with epoxy interior coating.	304 stainless steel housings; PVC pipe.	Carbon steel and 304 stainless steel vessels.	Filter vessel is epoxy lined carbon steel with stainless steel screen.
Options	Vapor phase units available in deep bed and radial flow design.	Two, three and four pod models are available.	Combination bag/cartridge units are available.	Combination bag/cartridge units are available.	N/A

VISIT www.bakercorp.com FOR ADDITIONAL SPECIFICATIONS. CALL YOUR LOCAL BRANCH FOR PRODUCT AVAILABILITY. 1-800-BAKER 12

PIPE, HOSE AND FITTINGS

BakerCorp inventories a complete range of pipe, hose and fittings in various diameters to exceed the needs of any application.

ALL TYPES OF PIPE AND HOSE

- Steel
- Aluminum
- Industrial groove

HDPE FOR HIGH PRESSURE AND FLOW

- Up to 30" diameters
- Fusion machines

MULTIPLE END CONNECTORS

- Bauer
- Quick disconnect
- Camlock
- Flanged

SPECIALTY MEDIA TO HANDLE ANY JOB

Activated Carbon—Granular, pelletized and powdered media to remove organic contaminants from vapor and liquid streams.

Impregnated Media—Effective removal of inorganic contaminants using activated carbon and zeolite based media. Impregnated with chemical reagents.

Ion Exchange Resins—Synthetically manufactured to carry an ionic charge, either positive or negative, ion exchange resins are an effective solution to highly complex applications such as perchlorate and dissoved metals removal.

Metals Removal Media—Specialty media to remove arsenic and other heavy metals.

Oil Removal Media—Specifically manufactured to remove oil and heavy organics from water. This media acts as a cost-effective prefilter for carbon adsorbers.

QUALITY ASSURANCE PROGRAM

BakerCorp has a rigorous maintenance program patterned after ISO 9000 certification guidelines. This QMS program is exclusive to BakerCorp. It ensures each and every one of our filtration units is inspected and of the highest quality each time it's ready for use by a customer.

LEVEL I—BEFORE DELIVERY

- Visual inspection of entire system including influent and effluent connections as well as gaskets, fittings and hatches to make sure they are operating properly and meet job requirements
- Load media if job requires

UPON DELIVERY:

- Review operation of bleed valve, drain valve and if applicable, isolation valves with customer
- Review plumbing—which is influent, effluent, and if customer is installing piping, torque specs
- Review any weather related issues like extreme heat or freezing temperatures

LEVEL II—UPON PICKUP

- All Level I "Before Delivery" inspections
- Inspect interior for lining condition and cleanliness

LEVEL III— MAINTENANCE CHECKUP

- Pressure test filter vessels using compressed air. Check all connections and openings for leaks
- Perform any necessary repairs found in Levels I–II

WASTE MANAGEMENT SERVICES

BakerCorp is your single source for pollution management. Our OSHA trained technicians, hazardous transportation network, hazardous and non-hazardous recycling facilities and fully permitted incineration facilities provide you with peace of mind while meeting regulatory compliance for any type of waste stream you may encounter.

- Contaminated soil & water
- Contaminated debris
- Industrial waste

MORE EQUIPMENT. MORE LOCATIONS.

BAKERCORP™

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